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DISEASES CAUSED BY BACTERIA AND FUNGI.

PLASTRIDGE, W. N., ANDERSON, E. O., WHITE, G. C., & RETTGER, L. F. (1934). **Infectious Bovine Mastitis. 3. Methods of Control.**—*Bull. Storrs agric. Exp. Sta.* No. 197. pp. 40. 6 figs., 16 tables. [31 refs.]

The authors give data regarding the influence of (1) periodic injections of autogenous vaccine, and (2) control measures, based on segregation of infected animals and improved sanitary measures, on the incidence of chronic contagious mastitis in five herds which were under observation for periods of two to six years and which each contained from 25 to 50 cows.

The vaccine consisted of whole heat-killed cultures, or the bacteria, resuspended in saline to which was added 0·2 per cent. of tricresol, varying doses being given at intervals of five weeks to three months.

In the two larger herds, one half of the animals were left as controls. In one of these, the average annual incidence of mastitis over a period of four years was 40·5 per cent. in the treated group and 51·2 per cent. in the control group. In the other herd, observed for two years, the annual incidence was 50 and 40 per cent. respectively in the treated group and 40 and 39 per cent. respectively in the controls.

In general, the results show that, although vaccination may aid in retarding the occurrence of abnormal milk in infected animals, particularly in recently affected animals, it is of little value in preventing new infections, and fails to bring about complete recovery. The authors conclude, therefore, that vaccination is not an adequate means of controlling mastitis, and that efforts should be directed to its control by the early detection and segregation of infected animals, the establishment of strict sanitary measures and the gradual replacement of infected animals by new heifers. Such a plan is described, and certain data are given to support the value of such measures. Details are given regarding many other aspects of mastitis. Recovery was rare in both treated and untreated animals. The incidence of the shedding of streptococci, and other laboratory evidence of mastitis, and of obviously abnormal secretion, all increased at a fairly uniform rate with each succeeding lactation, laboratory evidence being obtained several months before the milk became altered.—A. W. STABLEFORTH.

LEFÈVRE, A. (1935). Considérations sur le diagnostic et le traitement de la mammite streptococcique des vaches laitières. [**Diagnosis and Treatment of Streptococcus Mastitis**].—*Ann. Méd. vét.* **80.** 145-164. 2 figs., 4 tables.

The author gives a general account of the pathology of chronic streptococcus mastitis and of the methods for its diagnosis. Among the methods mentioned for the treatment of the disease, the best results attend the infusion of the udder with non-irritant solutions of the acridine derivatives. In nine cases treated with " entozon " the causal organism had disappeared in all after two injections. The author states that it is impossible to obtain beneficial results when there is considerable fibrosis of the udder.—S. J. EDWARDS.

SCHMIEDHOFFER, G. (1934). Adatok a mirígykór elleni aktiv immunizáláshoz. [**Active Immunization against Strangles**].—*Allatorv. Közl.* **31.** 3-4. [Abst. from abst. in *Rev. Path. comp.* **35.** 621].

In 1930 and 1931 the author vaccinated one thousand foals of various ages, some with live and some with dead cultures of *Streptococcus equi.* The results are claimed to be very good, and live vaccine appeared to be better than dead vaccine in conferring resistance against natural infection.

The importance of good hygienic and nutritional conditions is also stressed, and the use of immune serum to protect young horses in an outbreak of strangles is advocated.—J. E.

PAGNINI, U. (1934). L'enterococco nella patologia veterinaria. Contributo alla conoscenza degli agenti piogeni degli equini. [**The Enterococcus in Veterinary Pathology. Pyogenic Infection of the Horse**].—*Nuovo Ercol.* **39.** 426-434 and 440-448. 1 table. [71 refs.]

Streptococcus faecalis has been isolated from domestic animals on numerous occasions and, since it is capable of infecting man, it is of importance to comparative pathology. The author has carried out a detailed examination of the pus obtained from abscesses in various positions in six horses. In each case, pure cultures of an organism, the morphology of which resembled that of the enterococcus, were obtained. The original cultures were made on blood plates and those colonies which developed quickly and which did not cause haemolysis were picked off. The bacilli were identified as *Str. faecalis* by means of their sugar reactions, their resistance to bile, sodium taurocholate and heat, and by their virulence for mice, etc. When this organism is grown in meat broth a characteristic turbidity develops in 24 hours.—J. A. NICHOLSON.

HOLMAN, W. L., & CARSON, Arline E. (1935). **Technical Errors in Studies of Bacterial Variation. " The Metamorphosis of Streptococci into Spore-Bearing Rods ".**—*J. infect. Dis.* **56.** 165-195. 2 figs., 5 tables. [47 refs.]

From a considerable body of work, stimulated primarily by EVANS' striking report on what she believed to be metamorphic transformations of streptococci into spore-bearing aerobes and *vice versa*, Holman and Carson conclude that bacteria in pure cultures do show wide variations in size, form and structure, but that the fundamental nature and significance of these variations are not yet known. A conservative attitude is therefore desirable, especially as in problems of bacterial dissociation there is a growing tendency to accept uncertain evidence as if it were fundamentally established. Pure cultures must be established beyond doubt. Careful sterilization of media is necessary because the spores of certain aerobes may withstand autoclaving at 120°C. for one hour or steaming at 100°C. for one and a half hours if protected, e.g., in the author's experiments, by vaseline, whereas the same spores in broth are destroyed. Temporary alterations of morphology are common. Certain bacteria may be inhibited for a time and contaminate apparently pure colonies. Passage through animals offers many opportunities for contamina-

tion. The authors believe that these chances of error were not controlled in the work of EVANS and advance other explanations for her findings.—A. W. S.

KMOSKO, J. (1934). Příspěvek k epidemiologii sněti slezinné u skotu. [**The Epidemiology of Anthrax in Cattle**].—*Zverolék. Obz.* **27.** 281-286.

The author gives suggestions based upon his personal observations over a ten-year period in a district heavily infected with anthrax.

The most important factors predisposing to anthrax are considered to be the presence of virulent bacilli in the digestive organs, especially in the large intestine, and mechanical or chemical lesions of the epithelium of the digestive tract, caused by coarse forage plants such as *Equisetum* and *Carex*. The water supply is also very important and flat pastureland containing stagnant pools is a danger. As a protective measure it is necessary to prevent cattle with temperatures over 40°C. from entering the pastures and, each spring, to have all cattle going to pasture inoculated against anthrax with glucoside vaccine.—E. PRIBYL (BRNO).

TAHSIN, S. (1934). Türkiyede (Antraks) Dalak yanigi ve savasi ve Türk Universel Antraks (T.U.A.) asisi üzerinde Bilgiler. [**Anthrax in Turkey and its Control**].—*Yuksek. Zir. Enst. çalismal.* No. 5. Pt. 1. pp. 76. 18 charts on 13 plates, 13 tables, 1 map. [119 refs.] [Abst. from German translation pp. 1-74 of Pt. 2].

During the period 1922 to 1933 surveyed in this publication, anthrax has steadily grown to be a more pressing problem in Turkey. Deaths from this cause rose from 301 in 1922 to 4,228 in 1933. This rise is in part due to improved diagnosis, but nevertheless the disease is definitely spreading. Until 1930 Pasteur vaccine was used almost exclusively to combat anthrax, but the locally prepared T.U.A. vaccine has gradually replaced the older method and is now the only vaccine in use. July, August, September and October are the months during which major outbreaks occur.

Owing to the large animal population of Turkey and to the nomadic instincts of animal owners, anthrax control presents a difficult problem ; furthermore the main energies of the state veterinary service must be devoted to the control of rinderpest as this is an epizootic disease of greater economic importance.

The T.U.A. spore vaccine has been introduced to replace the less convenient Pasteur anti-anthrax vaccine. Anthrax strains have been stabilized in virulence by mouse passage. Several stabilized strains covering the requirements of the country have been incorporated in the vaccine in spore form. The advantages of this vaccine are that (1) it can be stored for long periods without loss of potency ; (2) a single small injection will produce in less than two weeks a strong immunity which lasts for 12 months ; (3) losses of stock as a result of vaccination are practically non-existent ; (4) the cost of preparation and administration of the vaccine is low, and (5) it can be administered safely at the same time as animals are being immunized against rinderpest. The regulations governing the preparation and standardization of the vaccine are noted.—E. J. PULLINGER.

DROMBRY, M. (1934). Recherches expérimentales sur le charbon des oiseaux. [**Experimental Anthrax in Birds**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 65. [44 refs.]

The first part of the thesis discusses the findings of authors who have written on anthrax in birds. Although cases in the ostrich, duck and several small birds have been reported, it is the general opinion that birds are resistant to this disease.

The second part of the thesis details experiments carried out by the author

in an attempt to clear up several of the conflicting statements of previous workers.

After successive passage of the organism through the dog he obtained a highly virulent strain which was capable of killing fowls and, even more readily, pigeons. He found the intramuscular route to be the most fatal. From experiments carried out on fowls that had received a previous injection, he concluded that birds could not be immunized by vaccination, yet in certain cases repeated intramuscular injections failed to set up the disease.

The bacilli, after passage through the fowl, assumed a shortened almost coccoid appearance and there was no significant rise in temperature in fowls inoculated with such a culture.

The numbers used in the experiments were too small for definite conclusions to be drawn.—J. E. WILSON.

GRAJEWSKI, W. (1934). Laboratoryjna kontrola szczepionki przeciwwaglikowej " carbozoo " Mazzucchi'ego. **[Laboratory Control of " Carbozoo " (Anthrax) Vaccine].**—*Wiad. weteryn.* **13.** 567-570. [Abst. from French summary].

According to tests carried out with the " carbozoo " vaccine on laboratory animals, the author concludes that the bacteria present in the vaccine are actually attenuated.—J. E.

TOMCSIK, J., & BODON, G. (1934). Ueber die serologische Identität der Kapselsubstanz von auf Nährboden gesüchteten und tierischen Milzbrandbazillen. **[The Serological Identity of the Capsular Substance produced by** *Bacillus anthracis in vivo* **and** *in vitro***].**—*Z. ImmunForsch.* **83.** 426-437. 5 tables. [4 refs.]

Twenty-two strains of *B. anthracis* were studied to ascertain whether the protein capsule formed in cultures by certain strains was identical with the capsules produced in the animal body. [In previous publications TOMCSIK and SZONGOTT (1932 & 1933) found that in cultures *B. anthracis* contains two antigenic components, a protein capsule and a polysaccharide soma (this *Bull.* **4.** 87. and *Z. ImmunForsch.* **78.** 86)]. Thirteen of the strains formed capsules in culture and the material proved to be indistinguishable by serological tests from that formed in the animal body. It is suggested that the Ascoli precipitin test would give more reliable results if a pure anticapsular precipitating serum were used instead of an antiserum prepared against whole bacilli.—E. J. PULLINGER.

—. (1934). **Tuberculosis Research.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 41-44 and 54-55.

I. WATSON, E. A., MCINTOSH, C. W., & KONST, H. " Prophylactic Vaccination of Cattle by the Method of Calmette-Guérin or ' BCG '." pp. 41-42.

Reference is made to the investigations carried out on the protective value of BCG vaccine against bovine tuberculosis. These investigations have been in progress for the past ten years and have now been terminated.

The results obtained have not been encouraging, and they state that the vaccine does not appear to be an efficient immunizing agent against natural infection with tuberculosis under field conditions.

" The composite picture of the cattle vaccinated with BCG may be distinguished from that of the unvaccinated cattle by the following features :–

" (1) A greater degree of relative resistance up to the age of puberty ;

" (2) Decline and disappearance of that resistance at early breeding age and, subsequently ;

" (3) An accelerated activity of the disease and the preponderance of lesions of the ' pathologically progressive ' type."

II. KONST, H. " Further Study of Bacillus Calmette-Guérin (BCG): Variability and Pathogenicity in Deep Cultural Growth." p. 42.

A study of the variability and pathogenicity of BCG in deep cultural growth was carried out. These experiments failed to confirm that an increase in virulence occurred, as claimed by PETROFF, SASANO and MEDLAR, and DREYER and VOLLUM.

" It is suggested that the attenuation of BCG in its present form has progressed so far that even the S forms are affected."

III. MCINTOSH, C. W., & MACKIE, C. " The Influence of Immunization Agents on Tuberculosis in Guinea Pigs." pp. 42-43.

Experiments were undertaken to ascertain the influence of the intraperitoneal inoculation of guinea pigs with :– (1) BCG ; (2) killed bovine bacilli, and (3) living bovine bacilli on (a) body weight during immunization period and after virulent inoculation ; (b) appearance of naked eye tubercles and, subsequently (c) the further course of the disease.

" The immunity developed would, therefore, appear to have been passive in character, serving only to delay the dissemination of virulent bacilli, and to retard the appearance of naked eye tubercles (to a corresponding extent prolonging life) but without further influence on the course of the disease ; this retarding effect in the first stages of infection was rather more prolonged in the guinea pigs receiving BCG than in those receiving killed bovine or living avian bacilli."

IV. MITCHELL, C. A., WALKER, R. V. L., & HUMPHREYS, F. A. " Types of Tubercle Bacilli found in Swine of Two Accredited Areas." pp. 43-44.

In order to ascertain the type of tubercle bacilli affecting pigs in two " Accredited Areas ", 96 specimens from pigs were collected and typed. Thirty-seven of the specimens contained tubercle bacilli, and all were of the avian variety.

V. HEATH, L. M. " Tuberculosis Research." pp. 54-55.

" Attempts to produce antibodies, hypersensitiveness or immunity to infection with the following fractions of unheated synthetic tuberculin proved unsuccessful : (a) the CO_2 precipitate ; (b) the dialysable fraction ; (c) the non-dialysable fraction. Likewise attempts with a water soluble trichloracetic acid precipitable fraction (protein) of tubercle bacilli also proved valueless in producing the above reactions. Guinea pigs were the test animals employed.

" *Tuberculin.*—The results of experimental studies with this product covering seven years – the period 1927-33 – have been reviewed, correlated and presented in the form of twelve studies, which it is hoped will be published shortly and may be very briefly summarized as follows :–

" 1. A remarkable constancy of agreement was found between complement fixation titrations and intracutaneous activities of tuberculins, even when the tuberculins studied were prepared on synthetic media under different conditions from different strains of tubercle bacilli or when subjected to fractionation with alcohol or acid ; or when reduced by proteolytic enzymes or by acid hydrolysis.

" 2. The agreement between complement fixation titrations and lethal dose methods was not always in accord, however, the explanation of which was found to be due to the fact that there were usually two principles in ordinary samples of synthetic tuberculin, particularly those which have aged. One such principle was found to be responsible for both the intracutaneous and lethal reactions, while the other was responsible for the specific lethal action only. The indications are that this specific lethal principle is split off by hydrolysis from the original containing both principles, as was first suggested by Dorset, Henly and Moskey.

" 3. The principle responsible for both the intracutaneous and lethal reactions is not dialysable and may be precipitated by trichloracetic acid in suitable concentrations. On the other hand, the specific lethal principle is dialysable and cannot be precipitated with trichloracetic acid.

" 4. Potent tuberculins may be obtained from cultures growing within a cellophane sac, which is in contact exteriorly with synthetic medium. Tuberculin may be obtained continuously from such culture by replacing at suitable periods, the supporting medium.

" 5. Tuberculin prepared from the diffusion products of bacterial growth is indistinguishable from tuberculin prepared in the conventional manner, as determined by guinea pig potency tests, antigenic values by complement fixation titration and precipitation of the active molecule by trichloracetic acid. It, however, differs from ordinary tuberculin in that

no precipitates are formed by the addition of normal hydrochloric acid in concentrations from n/100 to n/3. It also differs from conventional tuberculin in that its potency by either intracutaneous or lethal methods is completely destroyed by acid hydrolysis, whereas identical treatment applied to ordinary tuberculin destroys its intracutaneous activity only, leaving the lethal activity apparently unimpaired.

" 6. The precipitin reaction in tuberculin-antituberculous serum mixtures is no indication of either the lethal or intracutaneous activity of tuberculin, since it was found that precipitins may be demonstrated in such mixtures after the activity of tuberculin is completely destroyed by proteolytic enzymes.

" 7. The activity of similar fractions of tuberculin obtained by precipitating with alcohol is not always comparable in different samples of tuberculin. The wide variations found in the activity of such fractions appear to be dependent on both the strain producing the tuberculin and the technique employed in the production of the finished tuberculin.

" 8. The weight of bacillary growth in conjunction with the period cultivated may be accepted as a rough indication of tuberculin potency. Certain strains, however, regardless of their virulence, produce more potent tuberculin, weight for weight, of bacillary growth than do others. The manipulation of tuberculin during its preparation has an important bearing on its activity as indicated by intracutaneous, complement fixation and lethal dose methods.

" 9. The consensus of opinion appears to be that Koch's Old Tuberculin will retain its activity indefinitely. Concentrated synthetic tuberculin, on the other hand, appears to lose its intracutaneous and complement fixation activity when kept at room temperature for any considerable period. Its lethal activity is, however, not impaired and may be possibly enhanced. All samples do not, however, show decreased activity in the same degree.

" 10. Visible skin necrosis following the intracutaneous inoculations of tuberculin appears to be governed to an appreciable degree by the technique employed in its application and not solely to the potency of the tuberculin, nor to the degree of infection. If the inoculation is close to the surface of the skin visible necrosis is usually associated with the other phenomena of an intracutaneous tuberculin reaction. If, on the other hand, the inoculation is deep, visible necrosis may not accompany the other phenomena of the reaction.

" 11. The complement fixation method of Calmette and Massol was found unsuitable for titrating tuberculin for the determination of potency when hyperimmune and anti-serum formed part of the antigen-antiserum mixtures due to the sensitiveness of this method for demonstrating ' inhibitrice.'

" 12. Calmette's statement that purified tuberculin is incapable of serving as an antigen in complement fixation tests and employed to support arguments against the use of the complement fixation method for determining tuberculin potency, appears to be incorrect, since it was found that tuberculin prepared on synthetic media and purified by precipitation with alcohol or dialysis still revealed antigenic values."

—T. M. Doyle.

Wall, S. (1935). Sverige. De nya tuberkulösforfattningarna. [**The New Tuberculosis Regulations, Sweden**].—*Skand. VetTidskr.* **25.** 66-71.

This article is a reprint of some of the most important paragraphs of the new Swedish tuberculosis regulations which came into force on July 1st, 1934. On reading them, it will appear that the campaign against bovine tuberculosis, as was the case under the former regulations, is based on voluntary participation, on governmental support in the form of free tests, expert advice, compensation for the slaughter of clinical cases and, under certain conditions, return of expense in connection with clinical examination of the herd, and on compulsory slaughter of all cases of tuberculosis of the udder and genital system. However, more stress has now been laid upon clinical and bacteriological examination of the animals as well as the use of the tuberculin test, and thus upon the elimination of dangerous (open) forms of infection. If dangerous cases are found or suspected, such animals shall be marked according to the regulations, kept properly isolated from the others and slaughtered within 30 days after a confirmatory diagnosis has been received from an approved laboratory to which material has been sent for bacteriological examination. Compensation will then be paid. Further, the herd shall be clinically examined at least once a year, and samples of bulked milk from it shall be bacteriologically examined at least twice a year.

A meat inspector who detects tuberculosis in a young calf shall make efforts to trace the source of infection back to the herd concerned and give notice thereof to the authorities.

The new regulations prohibit movement of dairy cattle from certain parts of the country into certain provinces in the North and on to the Isle of Gotland, which are known to be free from bovine tuberculosis, except on application to the authorities ; if permitted, the animals are then provided with a special mark and accompanied by a licence from a veterinary surgeon stating they have recently passed a tuberculin test, or are coming from a herd which at least for a period of three years has been known to be free from reactors.

In a comment which follows, Wall discusses some points of the new regulations, and states that eradication of all clinical cases is important, but is only a step towards the real object – total elimination of all infected cattle, which is only possible by means of the tuberculin test. He expresses his regret that the BCG vaccination has not been adopted in the new regulations.—G. N. (FARSUND).

PETERSEN, G. (1935). Opdraetningscentral for tuberkulosefri Ungkreaturer i Store Vildmose. [**A Rearing Centre for Young Tuberculosis-Free Stock on a Large Moor**].—*Maanedsskr. Dyrlaeg.* **46.** 549-554.

The author gives a description of the working plan and records the regulations for a rearing centre for young tuberculosis-free stock that have been established by co-operation between the Association of Co-operative Creameries and the Ministry of Agriculture, which owns the moor. About 3,300 acres of cultivated land have been laid out for the farm, which began to operate this summer. The purpose of the centre is to provide those members of the creameries who have adopted a tuberculosis eradication scheme, but who have difficulties in isolating young stock, with accommodation for keeping them well isolated from the main herd. The centre, which is estimated to have a capacity of about 2,000 animals, is mainly pastureland. Accompanied by a certificate from a veterinary surgeon stating that the calves have recently passed a tuberculin test and an agglutination test for contagious abortion, the animals will enter the rearing centre in spring and be kept there for about a year and a half (two summers and a winter). The animals will be retested just before they are stabled in for the first winter, and tested the third time before they are sent back to the owners at the end of the second summer. The owners pay for the grazing, whereas the expenses for veterinary supervision and for the tests are paid by the Ministry.—G. N. (FARSUND).

RUPPERT, F. (1935). Vererbte Disposition und Tuberkulosebekämpfung. [**Heredity and Tuberculosis Control**].—*Dtsch. tierärztl. Wschr.* **43.** 209-211.

Ruppert quotes annual returns for Prussia to show that, although interest in the control of tuberculosis, as indicated by the increasing number of cattle embraced by the voluntary tuberculosis campaign, has increased year by year, there is as yet no decrease in the numbers compulsorily slaughtered on account of tuberculosis, or of the percentage of animals found to be tuberculous when slaughtered for food. He is of the opinion that this is due to the fact that the present schemes of control take no account of the view that there is a definite hereditary disposition to tuberculosis, which is of paramount importance under the present conditions of forced milk production. He supports his opinion by a comparison of the progeny of two bulls used in the same herd and whose offspring were in close contact in the same shed and had grouped themselves as they liked for feeding purposes. Out of 34 cows from one sire, 21 had to be removed from the herd on account of tuberculosis, whilst out of 23 cows from another sire only one had to be removed.

Mother and daughter were affected five times and sisters on three occasions. He concludes that contact is not of the importance hitherto accorded it, and that a hereditary and genetically dominant disposition is indicated and must be eradicated in the campaign against tuberculosis. He is emphatic that tuberculin testing cannot – as has been generally the case in Germany up to the present time – any longer be cast aside on the grounds that it detects forms which are of little importance from the point of view of the control of the disease.—A. W. S.

SVENDSEN, A. (1934). Aaben Lungetuberkulose blandt tilsyneladende sundt Kvaeg, der har reageret for Tuberkulin. **[Open Pulmonary Tuberculosis in Apparently Healthy Cattle which have Reacted to Tuberculin].**—*Maanedsskr. Dyrlaeg.* **46.** 381-399.

In a number of herds in which there were many apparently healthy animals that gave a positive tuberculin reaction, the author examined the reacting animals, lung mucus being obtained by means of a tracheal canula. As might be expected, one or more animals excreting bacteria were found in nearly all the herds. Although on *post-mortem* examination advanced and doubtless open pulmonary tuberculosis was demonstrated, the detection of tubercle bacilli was unsuccessful in a few cases. The author believes that clinical examination should be employed more extensively when control of the disease is first taken in hand in herds that are severely attacked, and that only after this rough and ready sorting should the separation by means of tuberculin tests be commenced.—H. C. B. (COPENHAGEN).

LÁSZLÓ, F. (1935). Beitrag zur Hauttuberkulose. **[Tuberculosis of the Skin].**—*Dtsch. tierärztl. Wschr.* **43.** 196-198. 1 fig.

After a brief general discussion of tuberculosis of the skin, László describes a case of elephantiasis of the right foreleg of a pig. The lesion was of a markedly productive character, and is likened to scrofuloderma of the bovine and of the human being. The limb was enlarged from the knee downwards, being 40 cm. in diameter and weighing 2·6 kg. All tissues including the bones were affected and numerous ulcerating lesions were present. The histology is detailed, emphasis being laid on the presence of numerous eosinophile cells.—A. W. STABLEFORTH.

STEINER, P. E. (1934). **The Pathogenicity of** *Mycobacterium tuberculosis* **(*avium*) for Dogs by Intracerebral Injection.**—*Amer. Rev. Tuberc.* **30.** 683-694. 2 figs. on 1 plate, 1 table. [4 refs.]

The main purpose of this investigation was to ascertain whether dogs, when injected intracerebrally, were more suitable than chickens for the isolation, identification and determination of the virulence of avian strains. Chickens are not too satisfactory, owing to the frequency with which they are subject to spontaneous tuberculosis, except when they are available from unimpeachable sources.

The author concludes, however, that the intracerebral injection of dogs with the avian type of *M. tuberculosis* is much too uncertain in its results to permit of its use for this purpose. The pathogenicity of the organism is very variable, the resultant lesions are in many cases not progressive and they do not reveal the usual histological changes associated with tuberculosis.—GWILYM O. DAVIES.

HOLTH, H. (1934). Videre undersøkelser over bacilltypene ved tuberkulose hos svinet. **[Types of Bacillus in Tuberculosis of Swine].**—*Norsk VetTidsskr.* **46.** 589-624. 2 tables. [English and German summaries : abst from orig.]

The author's earlier work on this subject, covering 25 cases of tuberculosis in swine [(1930). *Norsk VetTidsskr.* **42.** 337., (1931). *Ibid.* **43.** 270. and this *Bull.*

3. 663.], disclosed the fact that porcine tuberculosis might be caused by the bovine and the avian, as well as the human type of organism. In this further investigation, he examined cases of tuberculosis in swine found at inspection at an abattoir situated in an area where tuberculosis in poultry is known to be of comparatively frequent occurrence, but where hardly a single case of tuberculosis in cattle can be found. Altogether, lymph glands with macroscopic tuberculous lesions from 55 pigs have been included in this examination. The result showed that 45 cases were due to the avian type and three cases to the human type. The results of the remaining seven cases were uncertain, as it was impossible to demonstrate acid-fast bacilli in the material and all inoculation experiments gave negative reactions.

The author again maintains that the occurrence of tuberculosis in pigs indicates some form of open tuberculosis on the farm, either in the livestock or in human beings. He considers that this fact will prove to be of practical value in tracing sources of infection. As, in the present case, these generally seem to be the poultry, he emphasizes that more co-operative work (governmental support) must be undertaken as regards eradication from infected poultry flocks. Following the above indications, many of these flocks should be traced without difficulty. At the same time, poultry keepers who want to sell eggs for hatching or chicks or pedigree stock should be compelled to show a certificate that their farms are tuberculosis-free.

In this investigation, as well as in his former work, the author employed the old method – direct inoculation into rabbits and guinea pigs – in determining the types of bacteria. The same material has been used by BRANDT for further tests on suitable culture media, the results of which will appear later in a special paper.

—GUSTAV NAERLAND (FARSUND).

GRIFFITH, A. S., BUXTON, J. B., & GLOVER, R. E. (1935). **Immunisation Experiments on Calves with BCG.**—*Lancet.* **228.** 451-457. 7 tables. [13 refs.] [For absts. of previous articles of this series, see this *Bull.* **1.** 21 and **3.** 117].

This is the authors' third report of their investigations on BCG vaccine. They give a brief review of the literature since 1930 on immunity experiments on animals with the vaccine.

Experiments were carried out to determine the duration of the persistence of BCG in the tissues of calves after intravenous inoculation. Six calves were each given 100 mg. BCG. One died on the fifth day as the result of the inoculation, and two were killed on the 71st and 120th days after inoculation. Histological and cultural examinations showed that BCG disappears from the tissues of the calf before the fourth month following intravenous inoculation. In view of this result, the three remaining calves were tested for immunity by infection with virulent bovine bacilli administered *per os*. Two of the calves, tested seven and ten months after the administration of the BCG, proved to be solidly immune. The third calf, tested after 18 months, became infected, but to a less extent than control animals.

Experiments to ascertain the duration of immunity were carried out on 18 calves. These were inoculated by the authors' double intravenous method – two doses of 10 and 100 mg. respectively of BCG at an interval of 21 to 25 days. Complete immunity against infection *per os* was shown to exist and persisted from six months to over one year. Relative immunity lasted for a much longer period, as was shown by the less extent and greater chronicity of the infection in the vaccinated animals as compared with the controls. Experiments on the renewal of immunity showed that revaccination with 100 mg. BCG restored the immunity, but the protection was complete in a smaller proportion of calves than after primary

vaccination. The results suggested that revaccination does not give as good an immunity as primary vaccination.—T. M. Doyle.

Picard, E., & Denys, P. (1935). Etude comparative des lésions histologiques déterminées chez le lapin, par inoculation de BCG homogénéisé (type S) et de BCG normal (type R). [**Comparative Study of the Lesions in Rabbits caused by Homogenized BCG (Type S) and Normal BCG (Type R)**].—*C. R. Soc. Biol. Paris.* **118.** 1650-1653. [1 ref.]

Inoculation of rabbits with a homogenized culture of BCG produces a septicaemic infection which causes death in from two to six weeks. The only macroscopic lesion is moderate enlargement of the spleen.

Histologically the lesions in the lungs, liver and spleen are well marked. The lungs are riddled with follicles consisting of epithelioid and giant cells ; the sinuses of the spleen are similarly filled, the giant cells being somewhat smaller, and the liver parenchyma shows an abundance of exudative foci formed by accumulations of from ten to 30 mononuclear cells.

The histological lesions in rabbits inoculated with normal BCG are, in comparison, extremely slight, and correspond with those described by Coulaud.—N. B.

Blacklock, J. W. S., & Griffin, Mary A. (1935). **Tuberculous Meningitis in Children.**—*J. Path. Bact.* **40.** 489-502. 5 tables. [33 refs.]

In a consecutive series of 2,500 autopsies carried out in Glasgow on children between the ages of one day and 13 years there were 406 cases of meningitis and of these 241 were tuberculous.

A consecutive series of 75 were investigated bacteriologically and tubercle bacilli were isolated in 72 of these ; 59 were human and 13 were bovine strains. In a previous investigation on 114 cases, 86 were human and 28 were bovine.

The incidence of the bovine strain in country children in the series of 72 was 23·1 per cent. and in city children 16·95 per cent. In the series of 114 the incidence was 37 per cent. in country children and 20·7 per cent. in city children. The authors consider that the fact that 80 to 90 per cent. of the supply of milk to the city is pasteurized probably accounts for the lower incidence.

In the series of 72 it was possible to be certain of the primary site of infection in 45 cases. In 35 of 36 infected with human strains the site was thoracic and in six of nine infected with bovine strains the site was abdominal.

In the remaining three infected with bovine strains the site was thoracic and the primary focus suggested that the infection was air-borne.—W. J. Ironside.

I. Plum, N. (1935). **Human Tuberculosis – Bovine Tuberculosis.**—*Skand. VetTidskr.* **25.** 121-132. 1 table. [In English : Swedish summary].

II. Plum, N. (1935). Menneskетuberkulose – Kvaegtuberkulose. [**Human and Bovine Tuberculosis**].—*Maanedsskr. Dyrlaeg.* **47.** 47-56. 1 table. [1 ref.]

I. Although it is generally believed that tuberculosis has existed for thousands of years, *Mycobact. tuberculosis* was not demonstrated until 1882. It was subsequently established that the bacilli found in man, cattle and fowls showed distinct differences, and three types of tubercle bacilli are now recognized – human, bovine, and avian.

Investigations have proved that, although man is seldom infected with the avian type, he is readily susceptible to infection with the bovine type. Human patients affected with tuberculosis of the human type, however, cause no particular danger of infection to cattle, but can cause errors in the tuberculin test.

The author undertook experiments on two cows and three calves to determine

the pathogenicity for them of bovine tubercle bacilli in expectorate from human patients. Various doses and amounts of expectorate (maximum 10 c.c. per dose) were given in the food, and repeated tuberculin tests were carried out up to the time of slaughter four to five months after the beginning of the experiments. The cows reacted to tuberculin from the 19th day and the calves from the 33rd day and all five animals showed fresh tuberculous lesions in the alimentary tract with spread of infection into the chest when killed. It follows that human beings with open tuberculosis of the bovine type constitute a danger to cattle.

II. *Verbatim* translation of I.—J. M. L. Penhale.

Nieberle, K. (1935). Ueber die gewebliche Reaktion der Carnivoren (Edelpelztiere) gegenüber dem Tuberkelbazillus und die Pathogenese der tuberkulösen Sepsis bei diesen Tieren. [**The Tissue Reaction of Fur-Bearing Animals to the Tubercle Bacillus, and the Pathogenesis of Tuberculous Bacillaemia in these Animals**].—*Z. InfektKr. Haustiere.* **47.** 227-239. [13 refs.]

The primary seat of tuberculosis in these animals is commonly in the alimentary tract and usually consists of a small swelling of the intestinal mucosa and enlargement of the local lymphatic gland. Spread of infection occurs very rapidly after the primary onset and such spread is of a generalized type. Chronic tuberculosis of certain organs is practically unknown. No very noticeable lesions result from generalization, though there is generally a tumor splenis and pronounced yellow discoloration of the liver. Tuberculous lesions are not seen. Microscopically the organs are found to contain large numbers of tubercle bacilli, and phagocytosis of these organisms by macrophages is a characteristic feature. Necrosis of overloaded phagocytes occurs. Sections of the kidney reveal numerous tubercle bacilli in the glomeruli on the free side of Bowman's capsule. This indicates that the bacteria are excreted freely in the urine. The significance of the type of cellular reaction encountered in fur-bearing animals is discussed.—E. J. Pullinger.

Douglas, S. R., & Hartley, P. (1934). **The Effect of Dilute Solutions of Certain Antiseptics on the Viability of Tubercle Bacilli.**—*Tubercle, Lond.* **16.** 97-99. 1 table. [4 refs.]

Guinea pigs were inoculated intramuscularly with cultures of the bovine type of tubercle bacillus, that had been in contact with antiseptics, with the following results :—0·5 per cent. phenol killed *Mycobact. tuberculosis* in less than 24 hours, but 0·25 per cent. phenol did not kill it even after 14 days' contact. 0·02 per cent. " merthiolate " killed it in 24 hours, and 0·01 per cent. in four days. 0·1 per cent. formalin was lethal in 14 days except in one test case.—J. E.

I. Eickmann, & Schopen. (1935). Verfahren zur Vorbehandlung der Kotproben ohne zu grosse Schädigung der Vitalität der Tuberkelbakterien. [**Treatment of Faeces for Examination for Tubercle Bacilli without Lowering the Vitality of the Organism**].—*Dtsch. tierärztl. Wschr.* **43.** 97-99. 2 tables. [2 refs.]

II. Schultz, C. (1935). Ein Verfahren zur Vorbehandlung der Kotproben zum bakteriologischen Nachweis der Tuberkelbazillen ohne zu grosse Schädigung der Vitalität der Tuberkelbazillen. [**Examination of Faeces for the Presence of Tubercle Bacilli without lowering the Vitality of the Organism**].—*Ibid.* 100-101. [9 refs.]

I. In the examination of faecal material for tubercle bacilli it was found that in 13 out of 17 cases where these organisms were present they were destroyed by

the action of 15 per cent. antiformin acting for two to three hours. A 1 : 250 solution of potassium bichromate acting for 20 hours destroyed tubercle bacilli in only one out of 33 cases. About 5 g. of faeces were mixed with 30 c.c. of a 1 : 250 aqueous solution of potassium bichromate and were allowed to stand for 20 hours with occasional shaking. The mixture was then centrifuged and the deposit was washed and inoculated into guinea pigs.

From 1924 to 1929 faeces samples were treated with antiformin. During this period in only 4 per cent. of 146 samples could tubercle bacilli be demonstrated. After the use of potassium bichromate was introduced, 14 per cent. of 241 samples were found to contain this organism.

II. The findings of the previous authors are confirmed.—E. J. PULLINGER.

IMURA, K. (1934). **On the Influence of the Ethereal Oils upon the Culture of Tubercle Bacilli and upon the Development of Experimental Tuberculosis in Animals. (First Report).**—*J. Shanghai Sci. Inst.* **1.** 127-155. 14 tables, 10 charts. [20 refs.] [In English].

This is a study of the bactericidal and bacteriostatic action of certain ethereal oils upon tubercle bacilli, and of the influence of these oils in experimental tuberculosis. In order to study their action the oils were emulsified in 5 per cent. gum arabic solution.

" The bactericidal action of aromatic series of ethereal oils depends generally upon the existence of double-bonded carbon atoms in the side chain or OH-, CO-, and CHO-radicals ; and in the case of aliphatic chemicals the action depends upon the existence of double bonds and upon their number if any, contained in the formula."

Experiments show that ethereal oils have a stronger bactericidal action upon *Mycobact. tuberculosis* than upon *Bact. coli.* As regards the influence of limonene, dipentene, pinene and terpinole upon the growth of tubercle bacilli, it is shown that there are no very marked differences between them. The r-forms of both limonene and pinene appear to have a stronger bactericidal action than the l-forms.

The development of the tuberculous lesions in guinea pigs did not appear to be influenced to any degree by repeated injections of either l-limonene, l-pinene or r-pinene. R-limonene, however, seemed to be responsible for milder lesions.

—GWILYM O. DAVIES.

I. SACHWEH. (1935). Zur Frage der Abtötung von Tuberkelbazillen in Kalium-bichromat-Lösung. **[Lethal Action of Potassium Bichromate on Tubercle Bacilli].**—*Dtsch. tierärztl. Wschr.* **43.** 81-83.

II. PAGELS. (1935). Glyzerinverfahren zum mikroskopischen Nachweis von Tuberkelbazillen und etwaige Fehlerquellen durch Vermehrung säurefester Stäbchen. **[Glycerin Method for Demonstrating Tubercle Bacilli and Errors due to Presence of Acid-Fast Organisms].**—*Ibid.* 83-84.

III. SCHUMANN. (1935). Vorbehandlung der Bronchialschleimproben mit Kaliumbichromat. **[Treatment of Bronchial Mucus with Potassium Bichromate in Cultivation of** *Mycobact. tuberculosis***].**—*Ibid.* 84-85.

IV. PRÖSCHOLDT, O. (1935). Inwieweit stehen Fehlergebnisse in der Feststellung von Lungentuberkulose mit der Vorbehandlung des Bronchialschleims mit Kaliumbichromat in Verbindung und worauf sind dieselben zurückzuführen ? **[Accuracy of Cultivation of Bronchial Mucus Treated with Potassium Bichromate in Diagnosis of Tuberculosis].**—*Ibid.* 85-89. [10 refs.]

I. In medium containing 2 per cent. potassium bichromate, no multiplication

of saprophytic acid-fast organisms occurred, even if 1 per cent. of serum was added to the mixture. From this point of view, potassium bichromate solution is superior to glycerin water for the demonstration of tubercle bacilli, since overgrowth of saprophytic acid-fast organisms is prevented. Tubercle bacilli were unaltered in vitality after contact with 2 per cent. potassium bichromate solution for four days. This chemical may also destroy layers of fibrin lying around tubercle bacilli in bronchial exudate, so rendering them easy to stain.

II. If acid-fast bacilli are seeded into 1·5 per cent. sterile glycerin water they first decrease in numbers and later show slow multiplication. [These findings were based upon counting bacteria in stained preparations]. This property may be of value in the examination of bronchial exudate for tubercle bacilli. The material can be inoculated into glycerin water and incubated for 24 hours, after which it may be examined by microscopic means. In an investigation in which the diagnosis of tuberculosis was based upon the microscopic examination, in 2·6 per cent. of 5,277 cases saprophytic acid-fast bacilli were confused with tubercle bacilli. These saprophytic organisms must have been present in the original exudate ; they did not come from tap water [a common source of such organisms] since none was used in the preparation of films until after the carbol fuchsin stain had been washed off.

III. Potassium bichromate solution in a dilution of 1 : 500, if allowed to act upon bronchial mucus for 24 hours, destroys contaminating bacteria and simplifies the concentration of acid-fast organisms. In this way a higher percentage of positive results is obtained in the microscopic examination. In animal inoculation experiments, a higher proportion of positive results are also obtained with material so treated, whilst fewer guinea pigs die from inter-current infection.

IV. When the diagnosis of tuberculosis is based upon the examination of smears of bronchial exudate treated with potassium bichromate, doubt may arise as to the identity of acid-fast rods subsequently seen. If such doubtful samples are tested biologically, two-thirds prove to contain tubercle bacilli and one-third saprophytic organisms. Whilst treatment of exudate with potassium bichromate increases the number of positive diagnoses by about 15 per cent., this cannot be held responsible for causing doubtful cases. The chemical destroys contaminating organisms, thus assisting the microscopical, cultural and biological tests.—E. J. P.

Schmidt, E. (1935). Anreicherung der Tuberkelbakterien für die mikroskopische Untersuchung (Tropfenpräparat). [**Concentration of Tubercle Bacilli for Microscopical Demonstration**].—*Dtsch. tierärztl. Wschr.* **43.** 225-227. [8 refs.]

The following method of concentrating tubercle bacilli is recommended. Suspected material is treated with antiformin in the usual fashion and is then centrifuged. One drop of the deposit is placed upon a slide but is not spread out. The drop is then allowed to dry at room temperature. It dries out to show a densely opaque central portion containing coarse particulate matter outside of which is a less opaque zone in which the tubercle bacilli collect. The preparation should be stained with carbol fuchsin which is warmed but not boiled. After decolorization an alcoholic solution of picric acid is recommended as the counter-stain.—E. J. Pullinger.

McIntosh, C. W., Konst, H., & Mackie, C. (1934). **Johne's Disease or Paratuberculosis of Cattle.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 52-53.

This is a continuation of the previous year's work [this *Bull.* **5.** 113].

Of one sheep and three calves fed with infective material, the sheep remained healthy and the calves became emaciated. Control calves were placed with these animals from time to time, but none contracted Johne's disease.

" Faecal smears were made from the entire group, and one month after the first feeding of infective material to the three calves acid-fast bacilli resembling known Johne's bacilli were demonstrated in their faeces, followed by negative findings for respective periods of 4½, 7½ and 13½ months, since when such bacilli have been constantly present, while they have been detected in only one smear from a control.

" The three fed (and two control) cattle reacted to the initial Johnin test four months after feeding ; their subsequent reactions in general appeared weaker, possibly due to different concentration of Johnin, although the disease seemed more advanced in the fed animals.

" Avian tuberculin and Johnin gave fewer reactions when used in the eye than intradermally ; Johnin produced more (and mostly stronger) intradermal reactions than did avian tuberculin, and Johnin vulva reactions were usually stronger than simultaneous intradermal Johnin and avian tuberculin reactions in the same animal. Temperatures taken during the stabling period did not vary sufficiently or coincide with other symptoms to indicate the progress or otherwise of this disease."

—J. E.

THIERY, & GETAS. (1935). Note au sujet de la paratuberculose ovine. [**Johne's Disease in Sheep**].—*Bull. Acad. vét. Fr.* **8.** 210-212.

The authors record cases of Johne's disease in sheep in France, though the disease appears to be rare in these animals in that country. On the farm in which the disease was principally studied, Johne's disease has been found both in the cattle and in the sheep. Ten ewes died and the diagnosis of Johne's disease was confirmed by demonstration of the bacilli in the intestine in two of these. Out of 107 sheep tested with johnin on this farm, 23 gave positive, 15 doubtful and 69 negative reactions ; in another lot of 60 sheep, 22 gave positive, 3 doubtful and 35 negative reactions.—A. BROWNLEE.

HOLMBOE, F. V., & SLAGSVOLD, L. (1934). Paratuberkulose hos sau og geit. [**Johne's Disease in Sheep and Goats**].—*Skand. VetTidskr.* **24.** 573-585. 1 table. [English summary : abst. from orig.]

The authors describe symptoms and *post-mortem* findings in several cases of Johne's disease in goats, and in a single case in a sheep. In goats, the symptoms were a chronic progressive emaciation, without any pronounced diarrhoea, and death after several months' wasting. At *post-mortem* examination it was found that the mucous membrane of the ileum, caecum and first part of the colon was somewhat swollen, rough and yellow-tinged. The mesenteric glands were all enlarged, some of them being the size of a hen's egg. Caseous nodules, similar to those found in tuberculous lesions, were present in the largest glands, but there was no encapsulation and no calcification. In scrapings from the mucous membrane of the intestines and in material from the caseous nodules, large numbers of acid-fast bacilli were demonstrated, in pure culture in the nodules.

In the sheep, the lesions were very similar. Infected material was inoculated into guinea pigs, rabbits, hens, goats and cattle, but all remained healthy. Cultural tests from the inoculated animals showed no growth of acid-fast bacilli.

Intradermal tests with bovine and avian tuberculin and johnin were made on affected goats. A slight positive reaction was experienced with the avian tuberculin only.

The authors conclude that this is Johne's disease, but that it is atypical. From farm conditions and experimental data, the disease seems to be very slightly contagious, but does not seem to be connected with Johne's disease in cattle. The suggestion is made that some non-pathogenic acid-fast bacilli might have

become pathogenic under certain undefined conditions. The authors admit that the affected animals may have had an opportunity of ingesting faeces from poultry affected with tuberculosis, but there was no evidence that the disease in the goats was actually avian type tuberculosis.—Gustav Naerland (Farsund).

Guillot, G. (1935). Le bacille de Preisz-Nocard et les associations microbiennes. [**Action on** *Corynebact. pseudotuberculosis* **of other Bacteria grown in Symbiosis**].—*Rec. Méd. vét.* **111.** 11-14. [1 ref.]

The author points out that in the lesions of ulcerative lymphangitis *C. pseudotuberculosis* is often associated with other organisms which frequently render the isolation of the former difficult. By observing the effect of each of these organisms on *C. pseudotuberculosis* when grown together in broth, he concluded that neither streptococci nor pasteurella retard the growth of *C. pseudotuberculosis* but that *Salmonella paratyphi* (formerly *Bact. paratyphosum*) B and *Bact. coli* do, and mask its development : also that *C. pseudotuberculosis* is difficult to recover from cultures contaminated with *Pseudomonas pyocyanea*.—F. Blakemore.

Martinaglia, G. (1935). **A Peculiar Selective Site of** *Bacillus pyogenes* **in Dairy Cows.**—*J. S. Afr. vet. med. Ass.* **6.** 39-40. 1 fig. [4 refs.]

Corynebact. pyogenes has been found associated with various suppurative processes and certain types of mastitis on the Witwatersrand. In young heifers in several dairies an induration has developed on the supra-posterior aspect of the udder usually terminating in suppuration and subsequent rapid healing. *C. pyogenes* was frequently isolated from the abscesses in pure culture but was sometimes associated with a staphylococcus.—E. M. Robinson.

Mitchell, C. A., Walker, R. V. L., & Humphreys, F. A. (1934). **Swine Erysipelas.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* p. 51.

An enquiry into the incidence of this disease in Canada is being made ; so far it has been diagnosed in western Canada. Attempts to improve the agglutination test are being made.—J. E.

Stiles, G. W., & Davis, C. L. (1934). **Swine Erysipelas and its Economic Importance.**—*J. Amer. vet. med. Ass.* **84.** 895-906. 4 figs., 1 table. [6 refs.]

A brief summary is given of the history of the diagnosis of swine erysipelas in the United States, together with a general description of the symptoms and *post-mortem* findings.

The writers collected 298 suspected specimens and confirmed the diagnosis in 210 cases. Most of the specimens were from pigs suffering from arthritis ; there were also a few acute cases. Swine fever was eliminated on the grounds that the affected pigs had been previously immunized. Besides the *post-mortem* findings, various cultural and animal inoculation tests were carried out to verify the presence of the organism.

The rapid agglutination test was employed for diagnosis and was checked against the slow tube agglutination method in some cases. It was found efficient in use with blood or synovia in cases of some duration, but did not detect the fresh acute disease, presumably before antibodies were produced.—N. H. B.

I. Frede, W. (1934). Die toxische Herzmuskelerkrankung der Schweine – eine Vorkrankheit des Rotlaufs. [**A Toxaemic Heart Disease of Pigs which Precedes Swine Erysipelas**].—*Tierärztl. Rdsch.* **40.** 888-891 and 904-907.

II. Ariess. (1935). Die toxische Herzmuskelerkrankung. [**Toxic Heart Disease of Pigs**].—*Ibid.* **41.** 195-196.

I. It is stated that it may prove extremely difficult to produce experimental cases of swine erysipelas by the administration of cultures of *Erysipelothrix rhusiopathiae* whilst, out of 400 cases of alleged swine erysipelas examined by the author, it was only possible to isolate this organism in 42 per cent. of instances. It is suggested that *E. rhusiopathiae* only invades the pig after the animal has been weakened by a primary disease. This primary condition is described as a toxaemia of the heart which is followed by degeneration of the myocardium. The condition is thought to be due to some irregularity of the diet. Symptoms, prognosis and *post-mortem* findings in such cases are described in detail and the questions of prophylaxis and therapy are discussed.

II. The author confirms the findings of Frede regarding the incidence of toxaemic degeneration of the myocardium which may be encountered in various pig diseases. He discusses the hypotheses advanced by that worker with regard to the cause, prevention and cure of the condition.—E. J. Pullinger.

Lesbouyries, & Berthelon. (1935). La pasteurellose du porc. [**Pasteurellosis of Swine. (Swine Plague)**].—*Rec. Méd. vét.* **111.** 257-268.

This is an essay on porcine pasteurellosis. The history of so-called swine plague, which has now almost ceased to be regarded as an independent epizootic of swine, is traced from the original investigations of the disease by Loeffler to the present time, and it is pointed out that experience has shown that the importance of porcine pasteurellosis has been overestimated.

The authors describe in detail three clinical forms, peracute, acute and chronic, and point out the essential points in differential diagnosis. This is followed by a description of the morphological, cultural and biochemical characters of the causal organism, *Pasteurella suiseptica*. The invasion of the tissues by this organism is determined by certain predisposing causes, but once the virulence of the organism has been exalted in such animals others may become infected by contact.

Finally, methods of treatment and prophylaxis are discussed, in the course of which the authors state that a vaccine of *Past. suiseptica* has a real immunizing value. The correction of any hygienic or dietetic faults is, of course, essential. —Gwilym O. Davies.

Lesbouyries, & Berthelon. (1935). Abcès pasteurelliques chez les oiseaux. [**Local Wattle Pasteurella Infection in Fowls**].—*Bull. Acad. vét. Fr.* **8.** 53-58. 4 figs.

This article discusses the atypical form of fowl cholera in which the organism is found localized in the wattle, causing oedema and abscess formation, without any generalized symptoms of acute fowl cholera. From the experiments quoted it appears that this atypical form of the disease is not a generalized infection with an attenuated strain of *Pasteurella aviseptica*, the organism becoming localized in the wattle, but is a purely local infection following trauma, the wattle showing a resistance to the organism.

Unsuccessful attempts were made, by wattle inoculations with cultures of *P. aviseptica*, to utilize this local resistance of the wattle as a means of immunizing fowls against fowl cholera.—R. F. Gordon.

Basset, J. (1935). Immunisation active contre la pasteurellose aviaire ou choléra des poules. (Etude d'immunologie expérimentale). [**Active Immunization against Fowl Cholera**].—*Rev. vét., Toulouse.* **87.** 137-165. [6 refs.]

From experiments on some 400 fowls, carried out over a period of 12 years, the conclusion is drawn that the only reliable method of inducing a solid immunity against fowl cholera is by inoculation with attenuated living homologous antigen. The vaccine is difficult and tedious to prepare, the pasteurella being first cultured on weak agar, incubated for two months, and subcultivated on the same medium on four successive occasions at two-month intervals. Previous to use, the organism is transferred to weak broth. Both these media are prepared with only 250 g. of muscle per litre, without peptone. The vaccine retains its properties for about one year, and it is important to note that the greater its pathogenicity the more solid is the immunity produced. The dose, therefore, must be small and, as the susceptibility varies considerably in different subjects, it is necessary to give a second inoculation of double the quantity in eight days. The doses suggested are 0·125 c.c. and 0·25 c.c. respectively.

A certain amount of immunity follows the inoculation of massive and repeated doses of killed homologous cultures, but normal doses of these and heterologous antigens, as well as vaccination *per os*, are useless.

The author notes the polymorphism exhibited by the pasteurella, two distinct types of colonies appearing on cultivation. The pathogenicity of both, however, is the same.

The vitality of the organisms is rapidly destroyed by cold, disappearing completely in less than a month at a temperature in the neighbourhood of 10°C. On the other hand the vitality persists for more than 20 months in the incubator.
—Norman Bisset.

Tomašec, I. (1935). Prinos infekciji i patogenezi kod kolere peradi. [**Pathogenesis of Fowl Cholera**].—*Vet. Arhiv.* **5.** 226-240. 5 tables. [8 refs.] [Abst. from French summary].

The author carried out experiments on the artificial infection of poultry with fowl cholera and was able to confirm the findings of Manninger that after oral infection the bacteria enter the body through the mucous membrane of the mouth and throat and not through the stomach. Birds cannot be immunized against subcutaneous infection by the oral route.—J. E.

Chapman, Jeannette, & McKee, Clara M. (1935). **The Filterability of Bacterium lepisepticum.**—*Amer. J. Hyg.* **21.** 462-471. 2 tables. [19 refs.]

Using Kendall's K medium, which was devised for the isolation and cultivation of bacteria in the filtrable stage, the authors tested 20 strains of eight species of bacteria and 77 cultures of *Pasteurella lepiseptica*. In a few cases the cultures passed through Seitz filters whereas broth cultures of the same organisms were not filtrable. The organisms which appeared in the filtrate were identical in every respect with those in the original cultures.

Although their enquiries into the reasons for the filtrability have not led to a definite conclusion, it does appear to be linked up with the physical and chemical conditions of filtration and not to any biological change in the organisms. Invisible forms have not been demonstrated in the filtrate but normal organisms were present in concentrated filtrates.—Gwilym O. Davies.

Kolayli, C., Raif, Esin, I., & Arayici, E. (1935). Etude sur la pleuro-pneumonie infectieuse des chèvres d'Anatolie. [**Vaccination against Infectious Pleuro-Pneumonia of Goats**].—*Bull. Acad. vét. Fr.* **8.** 227-230.

The authors tried three kinds of vaccine prepared as follows :– (1) a mixture of 48-hour cultures isolated from lungs of affected goats in broth and on agar,

killed with 3 per thousand formalin ; (2) a mixture of ground-up hepatized lung tissue – 4 parts, thoracic effusion – 1 part, and 3 per cent. formolized physiological saline solution – 5 parts, the whole left at 20°C. for 24 hours and then neutralized with ammonia, and (3) No. 2 vaccine dried and resuspended in saline solution for use.

Each vaccine was given to 15 goats which, with 25 healthy controls, were tested for their immunity 20 days later by contact with 20 diseased goats. The mortality results in the various groups were :– 21 of the controls ; 5 with vaccine No. 1 ; nil with vaccine No. 2, and 1 with vaccine No. 3. [The disease under discussion here is the pasteurella infection, not the contagious caprine pleuropneumonia of unproved aetiology. – Ed.]—C. V. Watkins.

Lesbouyries, & Renauldon. (1935). Traitement de la mammite paraplégique colibacillaire de la vache. [**Treatment of Coliform Paraplegic Mastitis in Cows**].—*Bull. Acad. vét. Fr.* **8.** 246-248. [3 refs.]

The author describes a successful method for the treatment of acute coliform mastitis. A vaccine composed of a killed culture of the organism is injected and then followed by the administration of an anticoliform bacteriophage.—S. J. E.

Hohn, J., & Hermann, W. (1935). Die Typen der Gärtnerbakterien und die Quelle ihrer Infektion in der Tierwelt. [**Types of Gärtner Bacteria and their Origin in Animals**].—*Zlb. Bakt. I.* (*Orig.*) **133.** 183-196. 2 tables. [29 refs.]

Salmonella enteritidis (formerly *Bact. enteritidis* Gärtner) actually consists of several varieties which may be distinguished by different methods, the most definite criteria being serological methods. The authors have examined 97 strains by biochemical, cultural and serological methods and have thereby attempted to determine the animal origin of the different varieties, nearly all of which may infect man.

The origin of the Jena type, that is the original *S. enteritidis* Gärtner type, is still obscure, but the Ratin type which can be distinguished from the type species by biochemical tests only is found in rats. Both the Kiel (Dublin) and Rostock types are found mainly in calves, and less frequently in cattle, foals and swine ; they appear to be largely specific to the bovine species. The Moscow variety is considered to be bird-specific, as it has been found in ducks and associated with disease in human beings after consumption of ducks' eggs, but this conclusion is modified in the subsequent article.—R. Lovell.

Hohn, J., & Herrmann, W. (1935). Ergänzungen zu Arbeit im Zbl. Bakter. I Orig. Bd. 133 : " Die Typen der Gärtnerbakterien und die Quelle ihrer Infektion in der Tierwelt ". [**Supplement to the Article " Types of Gärtner Bacteria and their Origin in Animals "**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 277-281. 2 tables. [5 refs.]

In the previous article [see above], these authors considered that 43 strains of *Salmonella enteritidis* (formerly *Bact. enteritidis* Gärtner) dealt with were of the Moscow variety and that they were bird-specific, as they had been isolated from ducks and ducks' eggs. Re-examination of these strains revealed that they possessed the H factor " m " which is shared by *S. enteritidis* and *S. oranienberg*. The conclusion is therefore reached that the antigenic structure of these strains coincides with *S. enteritidis* var. *jena* which is in accordance with *S. enteritidis* strains isolated from ducks in Germany. The authors propose, however, to name these strains *S. enteritidis* var. *essen* as they can be separated from both the Jena and Ratin (Danyz)

varieties by biochemical tests, although all possess the same antigenic structure.

Examination of eight Chaco strains isolated in the Argentine showed that, although these strains also possessed a similar antigenic structure, they were biochemically different.—R. Lovell.

Magnusson, H. (1934). Aro förändringarna i " den vita fläcknjuren " hos kalv orsakade av abortinfektion ? [**Are Spotted Kidneys in Calves caused by** *Br. abortus* **?**]—*Skand. VetTidskr.* **24.** 707-710. [1 ref.] [English summary : abst. from orig.]

The author first gives a short description of the malady known under the above name and quotes some statistics worked out by Bergman which show the incidence of spotted kidneys in new-born (0·02 per cent.) and in fat calves (2·03 per cent.) as it occurs in calves slaughtered at the abattoir in Malmö. Thereafter he gives an abstract of a paper by Lübke [this *Bull.* **5.** 545.] in which that author claims to have been able to prove *Br. abortus* to be the cause of the lesions. Magnusson examined 15 affected calves, but in no case was he able to confirm Lübke's statement, as both agglutination test of the blood drawn from the heart of the calves and attempts to demonstrate the organism in the lesions gave negative results.

[Spotted kidneys in calves occur in areas which for years have been known to be free from *Br. abortus* infection].—Gustav Naerland (Farsund).

Beach, B. A., & Humphrey, G. C. (1935). **The Presence of Br. abortus in the Uterine Fluid and in the Milk and of Agglutinins in the Blood Sera of So-Called Ceased Reactor Cows.**—*Vet. Med.* **30.** 8-10. 1 table. [4 refs.]

An observation, extending over two years and 27 pregnancies, on 14 cows from a herd of 44 in which *Br. abortus* infection had been artificially induced. Two cows neither reacted nor aborted ; hence it was concluded that they had escaped infection. The remainder gave positive reactions. Blood was tested every month and all returned to negative or nearly so, only three giving positive reactions for any length of time.

Colostrum from each quarter and uterine fluid were taken at the time of calving and injected intraperitoneally into guinea pigs, which were killed after eight weeks and the blood tested for agglutinins – a titre of at least 1 : 400 being found in all cases. The blood was then cultured, and proved negative save in one case. This cow was shown to be harbouring *Br. abortus* in one quarter (October, 1932), but at two subsequent calvings she proved negative. She was slaughtered (March, 1934) and the udder, supramammary lymph glands and uterus were examined by guinea pig inoculation and cultural methods and found to be negative.

Since the titres of all animals rapidly decreased a few days after calving, it was concluded that there was a concentration of antibodies during non-lactation.

—H. E. Bywater.

Lübke, A. (1935). Ueber das Vorkommen von Bangbakterien im Blut von Kühen aus Banginfizierten Beständen. [**The Occurrence of** *Brucella abortus* **in the Blood of Cows in Infected Herds**].—*Z. InfektKr. Haustiere.* **47.** 240-244. 3 tables.

Lübke reports that, in a herd relatively recently infected with contagious abortion, *Br. abortus* was found in the blood stream of 15 out of 17 cows, whilst in a second herd, which had been infected for several years, *Br. abortus* was found in the blood of four out of 76 cows : the method used was the intramuscular inoculation of 5 c.c. of 0·5 per cent. citrated blood into one or two guinea pigs. The proportion of cows which were excreting *Br. abortus* in the milk was also much

higher in the first herd. The occurrence of *Br. abortus* in the blood on the one hand, and of antibody production and udder infection on the other, was not always associated; in several cases a bacteraemia was the only evidence of brucella infection.—A. W. Stableforth.

Molinelli, E. A., & Ithurrat, E. M. F. (1934). Brucellosis. Estudio de la infección por Brucella en las vacas de los tambos de la ciudad de Buenos Aires. **[Study of Brucella Infection in the Cows of Buenos Aires].**—*Sem. méd., B. Aires.* July 19th. 176-186. 3 tables. [10 refs.]

Immunological and bacteriological examinations of blood sera and milk showed approximately half the cows in Buenos Aires to be infected with brucella. The rapid macroscopic agglutination test of Huddleson and Abell was employed in the serum examination, and the technique of Huddleson, Hasley and Torrey in the bacteriological examination of the milk, and in the identification of the strains of brucella isolated.

The examination of the blood serum for the specific agglutinins was found to be much more reliable in detecting carriers than a similar examination of the milk.

Br. abortus (porcine strain) was isolated from one sample of milk, and infected one of the authors, probably by inhalation, as rubber gloves were worn.

The existing regulations are criticized, and more strict and severe methods of disposing of reactors are suggested.—Norman Bisset.

Holth, H. (1935). Oversikt over de diagnostiske undersøkelser i anledning smittsom kastning, foretatt ved Veterinaerinstitutet i 1934. **[Tests for Bovine Contagious Abortion carried out in 1934 (Oslo)].**—*Norsk VetTidsskr.* **47.** 100-103. 1 table.

A total of 16,232 blood samples from cattle from 3,035 different herds have been examined at the State Veterinary Institute (Oslo) during the year (as compared with 10,792 blood samples from 2,539 herds during the previous year). The results were that 1,305 samples gave positive, 175 doubtful and 14,752 negative reactions. In 1,845 herds abortion had been reported to have occurred and in 257 of these it was found to have been due to *Brucella abortus* infection. Forty-three herds were known to have been freed from the disease during the year. Fourteen blood samples from horses were also examined, of which one gave a positive and one a doubtful reaction. Samples from 16 sheep, two goats and one sow were negative. Out of 62 samples from human beings, 51 gave a negative reaction and 11 (five men, five women and one 13-year-old boy) gave a positive reaction.—Gustav Naerland (Farsund).

Larson, V. S. (1935). **Bang's Disease Control Project.**—*J. Amer. vet. med. Ass.* **86.** 303-310.

The author reports the encouraging progress of a scheme for the eradication of contagious bovine abortion from Wisconsin. Depending upon the result of an initial test of the herds, general conditions, and adaptability of the owner, one of the following three plans is adopted.

Plan A.—All positive reactors are removed to a separate farm, or disposed of, and the premises thoroughly cleaned and disinfected.

Plan B.—Reactors are kept in semi-isolation, being segregated in one portion of the cow-shed, and not allowed in contact with negative cattle in yards or pasture. For parturition and three weeks following they are removed to a separate building. Calves from reactors and non-reactors are reared, but are removed from all possible contact with infection before sexual maturity and are fed on milk from negative reactors, or on pasteurized milk. The usual sanitary precautions are taken.

Plan C.—Similar to B, except that positive and negative reactors are yarded and pastured together. It is only recommended as a temporary measure.

Retests are made in from 30 to 90 days, depending upon the amount of infection disclosed, and whether a dormant or active infection is being dealt with. Plan A, when properly carried out, has given by far the best results. Experiments with positively reacting bulls have given definite evidence that they may transmit infection to negative cows. They are, therefore, unsafe for service on such cattle. Many have been found to become sterile or, at least, uncertain breeders within a few months.

The value of the scheme has greatly increased since the standardization of technique and antigen, the latter being now entirely produced by the State.—N. B.

Mitchell, C. A., Humphreys, F. A., & Walker, R. V. L. (1934). **Experiments with Brucella abortus Anti-Serum.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* p. 46.

A continuation of the work of the previous year [this *Bull.* **5.** 119].

" Various methods for the production of a potent serum have been tried. Experiments in this regard are still continuing.

" A serum of some potency has been prepared. Tests on guinea pigs have indicated the following :–

" 1. Guinea pigs receiving several doses of anti-serum before a challenging dose of virulent Br. abortus organisms are afforded well-marked protection when compared with controls.

" 2. Guinea pigs infected prior to receiving anti-serum retain their weight and general health and survive longer than untreated controls. The anti-serum, however, fails to prevent a progressive infection.

" 3. Spleens from serum-treated guinea pigs dying from infection are larger and the parenchyma replaced by pathological tissue to a greater extent than untreated controls."

Kritschewski, I. L., & Galanowa, N. W. (1934). Untersuchungen über das Wesen der erworbenen Immunität. II. Mitteilung. Die Immunität der Uterusmuskulatur gegenüber Bac. abortus. [**Experiments on the Nature of Acquired Immunity. II. Immunity of the Uterine Muscle to** *Brucella abortus*].—*Arch. wiss. prakt. Tierheilk.* **68.** 277-293. 7 figs., 1 table. [26 refs.] [For abst. of previous article of this series, see this *Bull.* **5.** 335].

Hitherto it has been believed that the only change occurring in immunity was to be found in the antibody-producing cells, namely, the cells of the reticulo-endothelial system (Besredka's theory). The authors of this article point out that changes can and do occur in cells other than those of this system. They seek an explanation of immunity after antibodies have disappeared and of the absence of immunity after antibodies have been formed. They state that in immunity all cells of the body are changed, and only at certain times of infection are the cells of the reticulo-endothelial system of relatively greater importance. By experiment they have shown that endotoxin or exotoxin of micro-organisms has a certain action on, say, the muscles of an organ, but that this action is lost after immunity is gained. They have shown that the endotoxin of *Br. abortus* causes contraction of the uterus of the virgin guinea pig, and that this is distinct from the cells of the reticulo-endothelial system. Other antigens may similarly cause changes in other cells of the body in the production of immunity and, once changed, they lose their reactivity to antigen.—K. D. Downham.

Liddo, S. (1934). Brucellosi aviaria sperimentale. [**Experimental Brucellosis in Birds**].—*Pathologica.* **26.** 181-183. [14 refs.] [English and German summaries]. [Abst. from abst. in *Boll. Sez. ital. Soc. int. Microbiol.* **7.** 143].

The author gives details of his experiments on two hens and two pigeons, in which he attempted experimental infection by means of food contaminated with culture, and by intravenous injection of a culture [type of brucella not stated]. The general symptoms in the four birds thus treated were quite insignificant and the agglutination response was feeble.

The author concludes that it is possible to infect experimentally by the venous route : this point was not actually demonstrated as the cultures made from tissues of killed birds were negative.

MEYER, K. F., & GEIGER, J. C. (1935). **The Increasing Importance of Brucelliasis as an Occupational Hazard.**—*J. Amer. vet. med. Ass.* **86.** 280-286. 1 table.

Whereas a percentage of persons exposed to infection with *Br. abortus* (bovine or porcine strain) show either agglutinins or complement-fixing antibodies in their sera, clinical undulant fever is relatively infrequent in the occupational groups which come continuously into contact with brucella organisms. The authors consider that *Br. abortus*, and in all probability the porcine strain, and *Br. melitensis* are organisms endowed with a moderate degree of virulence and frequently infect persons who are exposed either by contact through the skin or by the alimentary tract ; these infections generally remain latent. Serological procedure alone is stated to give unreliable evidence of the incidence of latent infection. They therefore consider that combined serological, allergic and phagocytic tests furnish an approach for estimating the degree of infection in a group. For example, with the combined tests it is estimated that 73·4 per cent. of the personnel connected with the meat-packing industry in San Francisco have had contact with brucella.
—R. LOVELL.

ROSSI, P. (1935). Brucellose et vétérinaires. [**Brucella Infection in Veterinarians**]. —*C. R. Soc. Biol. Paris.* **118.** 1053-1055.

Of 28 veterinarians practising in a country district, five (17·85 per cent.) showed the presence of antibodies for *Br. abortus* in their blood serum, this being the only evidence of latent infection with this organism. Of those considered negative, 12 [or 13, as the numbers in the table add to 29 and not 28] gave reactions, but in dilutions below the considered critical titre.—R. LOVELL.

ROSSI, P. (1935). La fièvre ondulante à " Brucella abortus bovis ". [*Br. abortus* **Infection in Man**].—*Rev. gén. Méd. vét.* **44.** 65-92. 1 fig. [59 refs.]

The author reviews the history of our knowledge concerning the similarity and differences of members of the brucella group. References are made to the association between undulant fever and bovine abortion. Emphasis is laid on the methods of transmission, particularly by manual contact with contaminated animal products. The subject of transmission by drinking infected milk is not pursued.

Clinical manifestation of the disease in the human subject is classified as (a) latent, which is the most frequent ; (b) localized, characterized by cutaneous lesions, and (c) generalized, with symptoms and signs of an undulant type of fever.

A series of four cases are described in detail. Although the mortality may only be from 2 to 4 per cent. it is emphasized that it should not be regarded as a benign disease.

It is pointed out that the previously held opinion that *Br. abortus* does not produce abortion in pregnant women should be revised.

The whole article is an attempt to focus attention on the danger of infection of human beings with *Br. abortus*.—R. LOVELL.

Antunes, A., & Carneiro, V. (1933). *Brucella suis* e sua ação patogenica para o homem. (Terceiro caso de febre ondulante em São Paulo). [**The Pathogenic Action of the Porcine Strain of *Brucella abortus* on Man**].—*Rev. Soc. paul. Med. vet.* **3.** 107-119. 8 tables. [5 refs.] [French summary].

The number of cases of undulant fever due to the porcine strain of *Br. abortus* appears to be increasing. In one investigation in the United States of America the organism was isolated from ten cases out of 20, while Huddleson, in his researches on the identification of types of brucella, found the porcine strain 48 times out of a total of 140 strains.

The authors describe an organism isolated from an abattoir worker connected with pigs. The organism was agglutinated by a bovine anti-*abortus* serum at 1 : 1,600, and the serum of the invalid agglutinated a bovine strain at 1 : 500.

For the purpose of identification, the methods of Huddleson were employed. The organism, isolated under aerobic conditions, produced H_2S strongly and continuously, and did not grow in the presence of methyl violet at 1 : 100,000 or of fuchsin at 1 : 25,000. An abundant growth was obtained in the presence of thionin at 1 : 25,000 to 1 : 50,000 at the end of 48 hours. Marked pathogenicity for the guinea pig was evidenced. From these facts the authors concluded that they were dealing with a porcine strain.—Norman Bisset.

Haupt, H. (1934). Ueber die Ausscheidung von Staphylokokken, Corynebakterien und Abortusbacillen mit der Milch einer galtkranken Kuh. [**The Excretion of Staphylococci, Corynebacteria and Brucella in the Milk of a Cow Affected with Mastitis**].—*Arch. wiss. prakt. Tierheilk.* **68.** 208-214. 3 tables. [2 refs.]

The bacterial flora of the milk of a cow affected with streptococcus mastitis was studied over a period of two years. During this period, staphylococci were excreted for one month only and corynebacteria and *Br. abortus* intermittently during the whole period. Staphylococci were found in the milk of one quarter, the other two organisms in the milk of all four quarters. The presence of these organisms did not affect the streptococcus count in the milk, nor did the injection of therapeutic agents into the quarters destroy them. The author draws attention to the fact that, although during the whole period agglutinins were present in the milk in a high concentration, there was no adverse effect on the brucella organisms.

—S. J. Edwards.

Montgomerie, R. F., & Rowlands, W. T. (1934). **Pulpy Kidney Disease of Young Lambs in North Wales. Bacteria of Welch Group Isolated from Intestinal Contents.**—*Vet. J.* **90.** 399-403. 1 table. [7 refs.]

Continuing their work on pulpy kidney disease of young lambs, the authors describe the methods they adopted in the classification or typing of 77 strains of *Clostridium welchii*-like bacteria, isolated from the contents of the small intestine of 11 cases of the disease. Two were found to be non-toxic, 20 were accepted as strains of the classical *Cl. welchii* type A and the remaining 55 were accepted as being strains of *Cl. ovitoxicum*. This evidence was obtained by carrying out toxin and toxin-antitoxin tests in mice, types A, C and D anti-toxin being employed in the case of the latter.

From six of the 11 cases, 33 isolations were made, and all of them proved to be *Cl. ovitoxicum* in association, however, with other members of the *welchii* group, notably type A. During the course of the investigation, it was found that the cultures had a tendency to die under the conditions of storag in horse flesh meat medium. The maximum toxicity of four strains was reached about

the seventh day and remained at approximately the same level during the incubation period of 25 days. It is concluded that the disease of young lambs in North Wales is an infectious enterotoxaemia due to the proliferation of and toxin production by *Cl. ovitoxicum* (*Cl. welchii* Wilsdon type D).—D. R. Wilson.

Konno, T., & Hashimoto, K. (1934). Ueber Bedeutung von formolisierten Rauschbrand-Kulturen zur Schutzimpfung. [**The Value of Formolized Blackleg Cultures for Vaccination**].—*9th Rep. Govt. Inst. vet. Res. Fusan, Japan.* Pt. 2. pp. 15-28. 9 tables. [8 refs.] [In German : Japanese summary Pt. 1. pp. 132-133].

As the result of their tests on guinea pigs and calves, the authors consider that vaccination with formolized whole culture is a suitable method of protection, the results being equal to those obtained by the use of Nitta's germ-free filtrate vaccine while the preparation is less difficult. The vaccine is prepared by cultivating the organism aerobically at 37°C. in liver-piece broth and, when suitable growth is obtained, filtering through glass-wool and formolizing. Equally good results were obtained with 48-hour or one to three-week-old cultures, and 1 per cent. of formalin is recommended to ensure the death of spores. Guinea pigs are protected with 1 to 7 c.c. of vaccine, and calves with from 5 to 10 c.c., subcutaneously. Of 121 guinea pigs inoculated, 13 per cent. succumbed to test inoculation, the degree of protection varying inversely with the protective dose, e.g. only 65 per cent. of animals receiving 1 c.c. of vaccine were protected, as against 100 per cent. of those receiving 7 c.c. doses. Of 26 calves inoculated, all were protected against subsequent artificial infection in a controlled experiment. The immunity obtained appears to last more than eight months, and the vaccine, if stored in a cool dark place, is still efficacious after a year.—Norman Hole.

Kjos-Hanssen, J. (1935). Bråsott-vaksinasjon. [**Vaccination against Braxy**].—*Norsk VetTidsskr.* **47.** 156-158.

During the season of 1934, the author vaccinated 1,300 lambs and sheep up to five years old against braxy. He gives no statistics of the results, but states that they were very satisfactory and that he has seen no ill effect following the injection. [The vaccine employed is prepared at the Serum Laboratory, Copenhagen, and consists of a mixture of desiccated immune serum and desiccated whole culture. Before injection, the powder is suspended in distilled water].—G. N. (Farsund).

Cernaianu, C., & Mihailescu, M. (1935). Sur l'hépatite infectieuse nécrosante du mouton à *Bacillus oedematiens* en Bessarabie. Immunisation active à l'aide d'anacultures. [**Immunization against Infectious Hepatitis (Black Disease) of Sheep in Bessarabia, Rumania**].—*C. R. Soc. Biol. Paris.* **118.** 1585-1588. [11 refs.]

The disease described is similar to black disease in sheep in Australia. In the 44 cases studied by the authors, the associated fluke found was *Dicrocoelium lanceolatum*, never *Fasciola hepatica*. Cultures from the bone-marrow, the heart blood and especially the liver in the region of the necrotic areas showed the presence of *Clostridium oedematiens*.

A vaccine was prepared by adding 0·4 per cent. formalin to a 48 to 50-hour culture of *Cl. oedematiens* in glucose liver broth and incubating for ten days at 37°C. In 1,300 sheep vaccinated in 1933 and 2,980 in 1934, the mortality ceased almost completely three to four days after vaccination. One observation indicated that the immunity did not last more than two years.—A. Brownlee.

Fildes, P. (1935). **The Tryptophan and "Sporogenes Vitamin" Requirements of *B. botulinus*.**—*Brit. J. exp. Path.* **16.** 309-314. [7 refs.]

When precautions are taken to ensure that both tryptophane and the "sporogenes vitamin" [this *Bull.* **4.** 17.] are absent from other constituents of the medium, it can be shown that normal strains of *Clostridium botulinum* require both of these substances for growth. A warning is given that most commercial samples of natural amino-acids should be regarded as mixtures, other amino-acids usually being present in quantities which may be significant in a biological sense.
—W. R. Wooldridge.

Wrocenski, S. (1934). Flora bakteryjna zdrowej spojówki oka u konia. [**The Normal Bacterial Flora of the Conjunctiva in the Horse**].—*Przegl. wet.* **47.** 323-335. 3 tables. [12 refs.]

Of the conjunctivae of 200 healthy horses 11·5 per cent. were sterile while 88·5 per cent. were contaminated by staphylococci, especially by *S. albus*, *S. aureus*, and *S. flavus*, and a small number of non-pathogenic organisms.—K. S. (Lwów).

Frei, W. (1935). Atmungssysteme der Bakterien. [**The Respiration of Bacteria**].—*Zlb. Bakt. I. (Orig.).* **134.** 26-35. 1 table. [33 refs.]

The author has divided bacteria into seven classes according to the number and complexity of the enzymic oxidizing catalysts present in the micro-organism. The classes are as follows :– bacteria containing (1) dehydrase ; (2) dehydrase and a respiratory pigment ; (3) dehydrase, peroxidase and catalase ; (4) dehydrase, peroxidase, catalase and indophenoloxidase ; (5) dehydrase, peroxidase, catalase and cytochrome ; (6) dehydrase, peroxidase, catalase, indophenoloxidase and cytochrome, and (7) dehydrase, peroxidase, catalase, indophenoloxidase, cytochrome and a respiratory pigment. Obligatory anaerobes appear in class 1 ; whilst obligatory aerobes fall into those classes containing the most respiratory enzymes ; aerobes, which are also facultative anaerobes, are to be found in the intermediate classes. The chemistry of the oxidation-reduction systems of all the classes is discussed.—James Stewart.

Curran, H. R. (1935). **The Influence of Some Environmental Factors upon the Thermal Resistance of Bacterial Spores.**—*J. infect. Dis.* **56.** 196-202. 4 tables. [13 refs.]

This work was carried out with *Bacillus cereus* and a sporulating aerobe recovered from spoiled evaporated milk. Increased resistance to heat was shown by spores formed under natural conditions of environment, by those subjected to continuous drying or to alternate wetting and drying and by spores kept at moderate rather than low or high temperatures. Reduced thermal resistance was exhibited by spores long frozen at –15°C. and by those exposed to the prolonged action of their metabolic products.—J. W. Emslie.

Nicolle, C. (1935). Constitution des cultures pures et des virus en éléments vivants. Associations de virus. Variantes chez les inframicrobes. [**Bacterial Mutation. Association and Dissociation of Viruses**].—*Arch. Inst. Pasteur Tunis.* **24.** 139-178. [3 refs.]

This article is essentially a review of bacterial mutation, with particular reference to the relationship between the visible bacteria and the filtrable viruses. The general nature of the argument does not lend itself to abstraction.

Briefly, the changes in the characteristics of bacteria are illustrated by a consideration of the variations occurring in different species, e.g., S and R forms

of the tubercle bacillus, mutations in the group of proteus organisms, etc. The methods whereby variants arise and their bearing on the production of new forms of disease are also discussed. The author suggests that just as continuous mutation takes place in the visible bacteria, so similar alterations probably occur amongst the filtrable viruses, although in most cases means have not yet been devised for revealing such changes.—R. E. Glover.

Barber, C. (1935). Etude comparative entre le taux et la composition des cendres d'une espèce microbienne et sa virulence. [**Relationship between Amount and Composition of Bacterial Ash and its Virulence**].—*C. R. Soc. Biol. Paris.* **118.** 1655-1657. [3 refs.]

This short article describes experiments carried out on strains of streptococci and pneumococci of varying virulence to show whether there was any correlation in the amount and composition of the ash of bacteria and their virulence. The virulence of the different strains was found by subcutaneous injection of mice. It was found that the less the ash content of the bacteria the more virulent they became to mice and that, in general, the diminution of ash content was accompanied by a lowering of the potassium, sodium, magnesium, lead and iron content. The more virulent forms of the bacteria were accompanied by a higher calcium content of their ash than was found in the case of non-virulent or avirulent forms.—J. S.

Schmidt, S. (1935). Du mécanisme d'action de divers composés chimiques sur les toxines bactériennes. [**The Action of Various Chemicals on Bacterial Toxins**].—*Ann. Inst. Pasteur.* **54.** 325-331. [10 refs.]

The action of 200 organic compounds on diphtheria toxin was studied by preparing equimolecular mixtures which, after seven and 30 days' incubation at 37°C., were tested for neutralizing power by Ramon's flocculation method and for toxicity by inoculation of guinea pigs.

The following were highly destructive :- the halogen derivatives, notably trichlormethane and tribromomethane ; the hexylic and amyl alcohols ; formaldehyde, acetaldehyde and propaldehyde ; ethyl ether ; chloral and butyl-chloral ; phenol, resorcinol, cresols, benzyl alcohol, benzoic acid and aminobenzoic acids ; salicylaldehyde, vanillin, eugenol, anisaldehyde, cinnamic aldehyde, cinnamic alcohol and cinnamic acids. Heptyl and octyl alcohols and the majority of the esters were mildly destructive. The ineffective compounds included the hydrocarbons (pentane, hexane, heptane, octane and 43°C. paraffin wax), the primary alcohols, ketones and the lower homologues of the fatty acids. The higher fatty acids were increasingly destructive in their action as indicated by the efficacy of capric acid even in centinormal dilution.

Of all the chemicals used only the aldehydes destroyed toxicity without affecting the other specific properties. In the case of propaldehyde, destruction of toxicity was accompanied by considerable loss of antigenic power.—J. W. Emslie.

Otero, P. M., & Koppisch, E. (1934). La aspergilosis en el pollito. Estudio preliminar. [**Aspergillosis in Chicks. Preliminary Study**].—*8th Reun. Soc. argent. Pat. reg. N.* pp. 143-159. 14 figs.

The authors describe an epidemic of pulmonary aspergillosis among recently hatched chicks, and in those a few days old. Cultures from the lungs on Sabouraud's agar showed growths of *Aspergillus fumigatus* and *Rhizopus microsporum*. Experiments proved *A. fumigatus* to be the principal aetiological agent, artificial infection being successful by buccal, nasal, intravenous and intrapulmonary routes. The

source of the moulds was the crushed sugar-cane refuse of which the nests were composed.

The symptoms in the young experimental chicks were dyspnoea, diarrhoea and loss of weight, followed by convulsive movements and sudden quick jumps. In chicks infected intranasally it was noticed that, once infection was established, subsequent inhalation of spores resulted in paroxysms of dyspnoea lasting from 80 to 90 minutes, and resembling attacks of asthma.

Histologically, the condition was characterized by a granulomatous type of inflammatory reaction, with the formation of pseudo-tubercles in the lungs, and the presence in the same of the mycelial elements.—Norman Bisset.

DISEASES CAUSED BY PROTOZOAN PARASITES.

Adler, S., & Theodor, O. (1935). **Investigation on Mediterranean Kala Azar. VII. Further Observations on Canine Visceral Leishmaniasis. VIII. Further Observations on Mediterranean Sandflies. IX. Feeding Experiments with *Phlebotomus perniciosus* and Other Species on Animals Infected with *Leishmania infantum*. X. A Note on *Trypanosoma platydactyli* and *Leishmania tarentolae*.**—*Proc. roy. Soc. Ser. B.* **116.** 495-504, 505, 516-542 and 543-544. 10 figs., 8 tables. [22 refs.] [For abst. of previous article of this series, see this *Bull.* **3.** 533].

Further observations on canine leishmaniasis in Malta are recorded, and the prevalence of parasites in unbroken skin is emphasized. 10 per cent. of Maltese dogs were found to be affected, the skin being uniformly involved : this indicates that there are 1,500 dogs in Malta capable of infecting sandflies during the summer months. Fully 60 per cent. of the infected dogs appeared to be well nourished and in good health, the commonest symptom of disease being seborrhoea with patches of depilation, usually commencing near the eyes. Additional notes are included on pathological findings in the eye, liver, spleen and bone-marrow, and attention is drawn to two acute cases of disease in which few or no parasites could be detected in spleen smears. The authors consider that the most important lesions for the elucidation of clinical pathology are those of the stomach and intestine, which are the only alterations common to all fatal cases. These lesions consist of an infiltration of the mucosa and submucosa with plasma and macrophage cells which almost replace the lymphocytes, and may cause emaciation by interference with the absorption of food.

Experiments are recorded on the breeding of sandflies and the infection of *P. perniciosus* with *L. infantum*.

In breeding sandflies, it was found that a humidity of 100 per cent. was required for satisfactory laying ; laboratory-bred flies could not, however, be used for transmission experiments as very few of them would feed. The infection experiments were interesting in that proboscis infections were very rare, and in the observation that infection of the anterior stations only occurred towards the end of the sandfly season. A spermophyle was infected with *L. infantum* by inoculating flagellates deposited from the proboscis of an infected *P. perniciosus* into the capillary of a Hertig apparatus.

The last section contains some notes on *T. platydactyli* of the gecko, and records a case of infection which may have been due to a gecko swallowing an infected sandfly.—U. F. Richardson.

Rao, M. A. N., & Muddaliar, S. V. (1934). **Some Observations on the Trypanosomes of Cattle in South India.**—*Indian J. vet. Sci.* **4.** 362-396. 14 figs., 3 plates, 6 tables. [35 refs.]

This article records an investigation into the nature of bovine trypanosomiasis in southern India. The smaller trypanosome occurring in cattle was identified as *Tryp. evansi*, and the parasite of the ox appeared to be identical with that of the horse and dog, the average length of the organism in all these animals being 25μ. In white rats the average length was increased to 30μ. Strains of the trypanosome from dogs appeared to be more virulent than those from cattle or horses. Rats immunized against surra, by infection followed by treatment with " Bayer 205 ", proved immune to bovine or equine strains but, in some cases, reinfection was obtained with dog strains and with strains which had developed exceptional virulence during passage through guinea pigs. This enhancement of virulence in guinea pigs was a temporary phenomenon which disappeared in succeeding passages.

In cattle, experimental infection caused a mild type of disease with scanty trypanosomes in the peripheral blood which was only infective to laboratory animals in large doses (over 2 c.c.). After a few months the blood ceased to be infective, but red cell adhesion tests continued to give positive readings.

Some doubt is thrown on the possibility of cattle acting as a reservoir for the trypanosome sufficiently long to maintain the disease over the non-surra season, and an examination of calves used for rinderpest virus, which might be expected to cause a flare-up of trypanosomiasis, only revealed trypanosome infections during the surra season. Some investigation into the role of species of *Tabanus* as transmitting agents was undertaken, and doubt is expressed as to their importance in this connection.

One case of *T. theileri* infection in a bull of the Madras Corporation is recorded, the animal dying after exhibiting symptoms similar to those of piroplasmosis.
—U. F. Richardson.

Schulz, K. (1935). **Dourine or Slapsiekte. A Preliminary Report on its Occurrence in Equines in Griqualand West, Boshof, and Jacobsdal Districts.**—*J. S. Afr. vet. med. Ass.* **6.** 4-15. 2 figs. [11 refs.]

Dourine was first diagnosed in South Africa in 1914 but the diagnosis was not definitely confirmed until 1918. The author describes his experiences in the carrying out of a campaign against the disease on the lines of that waged in Canada by Watson. At the time of publication about 15,000 complement-fixation tests had been carried out on about 5,000 equines. The methods of spread under South African conditions are discussed. Many points of interest are discussed in connection with the symptomatology of the disease and the susceptibility of equines to it under local conditions. A number of positive reactions were obtained in young foals, infection having apparently occurred while the animals were sucking from udders soiled with discharges.—E. M. Robinson.

Adams, A. R. D. (1935). **Trypanosomiasis of Stock in Mauritius. I.** ***Trypanosoma vivax*****, a Parasite of Local Stock.**—*Ann. trop. Med. Parasit.* **29.** 1-18. 2 figs., 5 tables. [13 refs.]

This article records the detection of a trypanosome, morphologically resembling *T. vivax*, in cattle in Mauritius. As a strain of trypanosome which was non-infective to guinea pigs was encountered in cattle from five different stables, it is thought that this species may be wide-spread in the island. The infection failed to respond to treatment with " atoxyl " and arsenious acid, the routine treatment used locally for *T. evansi* infection in cattle, but appeared to be non-pathogenic in these animals. In the course of the inoculation of laboratory animals, fleeting infections were produced in mice and rabbits but guinea pigs and dogs proved refractory. It is

suggested that transmission is probably effected by *Stomoxys nigra* which is so numerous on the island that milch cows are kept confined to dark stables in order to avoid its attacks.

The greatest importance of the discovery lies in its bearing on the campaign which was initiated in 1921 to eradicate surra. Surra first appeared in Mauritius in 1901, and in 1902 caused such a severe loss in cattle and horses used for transport that the government had to come to the aid of the sugar industry by introducing steam tramways. Hitherto it has been assumed that trypanosome infection encountered in cattle or horses was due to *T. evansi*, and the method of control has been the treatment of affected bovines with " atoxyl " and arsenious acid, and the slaughter of affected equines, as their treatment was not considered economically practicable. Since the *T. vivax* infection in cattle does not respond to the surra treatment, and may not be sufficiently severe in horses to justify slaughter, some modification of the routine of control may be required.—U. F. R.

DUKE, H. L. (1935). **On *Trypanosoma brucei*, *T. rhodesiense* and *T. gambiense* and their Ability to Infect Man.**—*Parasitology*. **27.** 46-67. [32 refs.]

This article records experiments on the infectivity to man of strains of *T. brucei*, *T. rhodesiense* and *T. gambiense* from various sources, and maintained for varying periods in laboratory animals and game. Three strains of *T. brucei* from different areas of Uganda were found to be incapable of infecting man by the bites of infected *Glossina palpalis*. A strain of *T. gambiense* isolated in 1920 was found to be readily infective to man by inoculation in spite of the length of time it had been maintained in laboratory animals. This strain had lost its transmissibility by *G. palpalis* and was only capable of producing a very low percentage of gut infections. Other strains of *T. gambiense* were shown to be pathogenic for man by cyclically infected tsetse. Two strains of *T. rhodesiense*, one of which had been isolated three years previously, proved infective to man, but another strain failed to infect on three attempts. Another strain of *T. rhodesiense* proved pathogenic after passages through a bushbuck, fowl, three cattle and two monkeys, but failed to infect after passage through a large number of guinea pigs.

In discussing these results, the author emphasizes the view that *T. rhodesiense* is purely a strain of *T. brucei* which is capable of infecting man and suggests that, although no wild strains of *T. brucei* have yet been proved pathogenic for man, it is probable that such strains exist, and would appear if the game tsetse was forced to rely on man for its principal source of food. The reverse process, the loss of pathogenicity by *T. rhodesiense*, can apparently occur. The chance of human infection may depend upon the adaptability of the strain of trypanosome and on the resistance of the individual, and there is some evidence that the preceding hosts may have an influence. It appears, for instance, that passage through guinea pigs may reduce the pathogenicity.

The retention of pathogenicity by strains of *T. gambiense* is considered as further evidence of its long establishment as a parasite essentially dependent upon man, and seems to justify considering it as a distinct type, if not a complete severance from the parent stock.—U. F. RICHARDSON.

VAN DEN BRANDEN, F. (1935). Pouvoir infectant du sang de rats albinos, après injection sous-cutanée massive de *Trypanosoma congolense* et de *Trypanosoma brucei*. [**Infective Power of the Blood of Albino Rats after Massive Subcutaneous Injections of *T. congolense* and *T. brucei***].—*C. R. Soc. Biol. Paris.* **118.** 1479-1481. [1 ref.]

Experiments showed that if white rats were inoculated with large doses of

T. congolense or *T. brucei* their blood, after 24 hours, was as infective as a direct inoculation, but after 36 to 48 hours their blood, though still infective, produced a parasitic reaction in subinoculated animals two days later than that produced by direct inoculation. The author suggests that, at the latter period, blood trypanosomes were rare, the majority of the parasites having entered the organs in which they multiply before reinvading the blood on the fourth or fifth day to produce the normal peripheral blood infection.—U. F. RICHARDSON.

DUKE, H. L. (1935). **Further Studies of the Behaviour of *T. rhodesiense*, Recently Isolated from Man, in Antelope and other African Game Animals.**—*Parasitology*. **27.** 68-92. [21 refs.]

This paper records further experimental work on the effect of prolonged maintenance in antelope on the pathogenicity to man of strains of *T. rhodesiense*. Evidence is produced that prolonged residence in antelopes tends to impair the power of a strain to infect man when infection is attempted by the cyclical route, but that under similar circumstances the same strain may retain its pathogenicity when inoculated by the syringe. It is suggested that cyclical development in the tsetse may be selective, and that all strains present in the antelope may not be taken up by the flies. Some of the experiments suggest that passage of a strain through a monkey prepared the trypanosome for survival in man.

The research also suggests that human beings differ in their susceptibility to *T. rhodesiense*, in that mildly virulent strains may infect one individual but not another, but that strongly pathogenic strains will infect anyone.

A young hyena infected with *T. rhodesiense* for 180 days remained healthy, and flies infected from a monkey, subinoculated with the blood of this hyena, infected a human volunteer. [So many factors have to be considered in interpreting the results of these experiments that it would be advisable for those interested in this subject to consult the original paper].—U. F. RICHARDSON.

CORSON, J. F. (1935). **Further Observations on Francolin and Guinea-Fowl as Reservoirs of *Trypanosoma rhodesiense*.**—*J. trop. Med.* (*Hyg.*). **38.** 46-47. 1 table. [4 refs.]

Three out of 19 francolin and three out of nine guinea fowl were infected with *T. rhodesiense* by feeding infected *Glossina morsitans* on them, the infection being demonstrated by subinoculation of their blood into rats. One bird remained infective for three months. Infection was not transmitted by *G. morsitans* fed on the infected birds, but the author considers that there can be little doubt that infection can proceed to complete development in tsetse fly. Sixty-seven guinea fowl were trapped in a *G. morsitans* area where sleeping sickness had existed and their blood was inoculated into rats, but it failed to produce any infection.—U. F. R.

WOOD, Fae D. (1934). **Natural and Experimental Infection of Triatoma protracta Uhler and Mammals in California with American Human Trypanosomiasis.** —*Amer. J. trop. Med.* **14.** 497-512. 7 figs. on 1 plate. [12 refs.]

This article records investigations into the life-history of a trypanosome from the digestive tract of specimens of the bug *T. protracta* collected from the nests of wood rats in California. This strain of trypanosome was inoculated into 16 species of mammals, of which 12 (including one dog) became infected. In mammalian blood the parasite was indistinguishable from *Tryp. cruzi*, but none of the infected animals developed disease symptoms. Attempts were made to increase the intensity of infection by splenectomy, the inoculation of testicular extract, keeping the experimental animals at a high temperature, and rapid passage,

but without success. Only one out of five attempts to reinfect recovered animals succeeded, indicating a partial acquisition of immunity.—U. F. Richardson.

Wagener, K., & Greve, H. (1935). Die Feststellung der Trichomonadeninfektion beim Rinde in der Neumark. [**Trichomonas Infection of Cattle in the Neumark**].—*Tierärztl. Rdsch.* **41.** 340-341. [11 refs.]

This article records the detection of trichomonas infection in cattle in north Germany, associated with the classical symptoms of sterility, vaginal catarrh, pyometra and abortion. The disease was detected in a village where small dairies were the rule and where two bulls were kept and used in common by the various establishments. The authors think the disease must be more prevalent in north Germany than is commonly supposed.—U. F. Richardson.

Söntgen, K. (1935). Die Zuchtausfallschäden im Regierungsbezirk Wiesbaden mit besonderer Berücksichtigung der Trichomonadeninfektion. [**Losses in Breeding Stock around Wiesbaden with Particular Reference to Trichomonas Infection**].—*Tierärztl. Rdsch.* **41.** 319-323. [9 refs.]

In the course of the examination of herds in the neighbourhood of Wiesbaden, in connection with the antituberculosis measures, severe outbreaks of abortion were encountered. In three out of five districts 34·3 per cent. of the adult cows failed to calve, whilst in the other two districts the sterility rate was only 9·8 per cent. There were a large number of abortions in the first six weeks of pregnancy in the affected districts, and a trichomonas infection of the sexual organs was prevalent, whilst in the other districts only one case of early abortion was encountered, and no trichomonas infection could be detected. Affected cows readily responded to treatment with Lugol's solution of iodine. In bulls, more prolonged treatment is required and recovery is difficult to prove. It is, therefore, often advisable to obtain a new bull rather than to resort to treatment.—U. F. R.

Mayhew, R. L. (1934). **Studies on Coccidiosis. VIII. Immunity or Resistance to Infection in Chickens.**—*J. Amer. vet. med. Ass.* **85.** 729-734. 6 tables. [19 refs.] [For abst. of previous articles of this series, see this *Bull.* **2.** 645. and **5.** 549].

The author suggests the possibility of producing strains of fowls highly susceptible to coccidiosis and others only slightly so.

He carried out experiments to test the practicability of developing a resistance by repeated infection, the results being given in tabular form. He considers this method to be of little promise and points to the difficulty in controlling natural infection in practice. He points out that the common belief among poultry farmers, that chicks are resistant after they are ten to 12 weeks old, is erroneous, and quotes cases where 40-week-old birds have succumbed.—J. E. Wilson.

Yakimoff, W. L., & Sokoloff, I. I. (1935). Eimeria polaris n.sp. Kokzidie der Rentiere. [*Eimeria polaris* **n.sp. Coccidia of Reindeer**].—*Berl. tierärztl. Wschr.* **51.** 308-310. 1 fig., 5 tables. [3 refs.]

This article refers to previous observations on the coccidia of deer, and records the finding of three types of oocysts in the faeces of reindeer. Two of these types were thick-shelled, with a flattening of one end and a distinct micropyle, and had an average size of about 27·5 by 17·2μ. In spite of a difference in shape, one type being egg-shaped and the other cylindrical, the authors consider that these oocysts belonged to a single species which differed from *E. wassilewsky* in the presence of a micropyle and in the terminal flattening. For this species they suggest the

name *E. polaris*. The third type was smaller, but only four oocysts were encountered, and it was not possible to form any definite conclusion as to the species involved.—U. F. Richardson.

Becker, E. R., Hall, Phoebe R., & Madden, Ruth. (1935). **The Mechanism of Immunity in Murine Coccidiosis.**—*Amer. J. Hyg.* **21.** 389-404. [11 refs.]

It had previously been shown that rats are readily immunized against *Eimeria miyairii* infection by feeding with 1,500 sporulated oocysts daily for five days; experiments are now recorded showing that feeding with 50 oocysts a day for four days would also produce immunity. Vaccines of ground oocysts, or extracts of infected or immune intestine failed to give any protection, as did also the serum of immune animals. Blocking of the reticulo-endothelial system or splenectomy did not increase susceptibility, and no evidence of a bacteriophage principle could be obtained. It is suggested that the epithelial cells may either acquire the property of blocking the entrance of sporozoites or that having become sensitized, they provide an unsuitable environment for development.—U. F. Richardson.

Béchade, Desroziers, & Pelletier. (1935). Piroplasmose équine en Haute-Marne. [**Equine Piroplasmosis in Haute-Marne, France**].—*Rec. Méd. vét.* **111.** 197-203. 2 tables.

In this paper the authors record their experiences with piroplasmosis of horses in the Haute-Marne Department of France. They find the disease to be more wide-spread and cases more frequent than is generally supposed. The cases met with were limited to the Meuse valley region and were most common in springtime.

The clinical history of nine selected cases is given. In all of these the causal agent proved to be *Babesia caballi*. The parasites were never numerous in blood smears and could often only be demonstrated with difficulty. The authors regard *Ixodes ricinus* as the transmitting agent and comment on the scarcity of these ticks on horses and their frequency on other farm animals.

Haemoglobinuria and an icteric discoloration of the visible mucous membranes were by no means constant symptoms. An anaemic conjunctiva was, however, commonly shown.

In the treatment of the condition, " gonacrine " gave very satisfactory results. They report one case of shock following the use of trypan blue.

They applied the blood sedimentation and Fulton's tests in several cases. The results obtained were identical with those given in cases of equine infectious anaemia. This they ascribe to the fact that these reactions arise as a result of a general anaemic condition and not from the presence of any specific aetiological agent.

The authors find that diagnosis presents many difficulties, particularly where equine infectious anaemia exists in the same locality. The two diseases have many symptoms in common. They quote one case of dual infection. The sedimentation tests fail to differentiate between them, and they find diagnosis of piroplasmosis by microscopical demonstration of the parasite unreliable. They suggest that " gonacrine " should be injected in the first place as a routine procedure as its specific therapeutic action in piroplasmosis will then serve not only a curative but also a diagnostic purpose.—C. Davenport.

Machattie, C. (1935). **Theileriasis of Young Calves in Baghdad Dairies.**—*Trans. R. Soc. trop. Med. Hyg.* **28.** 649-654. 6 figs. on 1 plate. [7 refs.]

An investigation into the mortality of calves in Baghdad dairies, carried out

between July 18th and October 30th, 1934, revealed a loss of 148 calves out of 250. 119 succumbed to an acute theileria infection, and 29 to other causes. 102 animals survived, but the majority of these showed evidence of theileria infection. The usual incubation period was 14 days, but two cases showed theileria infection on the sixth day after birth. At the height of the attack, which occurred between the 17th and 19th days of life, 90 to 100 per cent. of the red blood corpuscles showed theileria infection, and plasma bodies were numerous in the lymphatic glands and liver and sometimes occurred in the blood. The disease appeared to be usually an uncomplicated theileriasis : Jolly bodies and anaplasma-like structures occurred in small numbers, *Babesia bovis* was seen on rare occasions and *Trypanosoma theileria* was encountered in one six-day-old calf. The parasites first appeared in the tailed form, but at the time of crisis ring forms predominated, being replaced by the *Th. mutans* type of organism as recovery progressed. Few symptoms appeared in the early stages of the disease, the crisis being marked by sudden collapse and death in a fit. Jewish dairy proprietors stated that they had known the disease before the war, but they considered that it had become more prevalent since the introduction of Indian and Ayrshire cattle between 1917 and 1921. The author concludes that the organism concerned is *Th. annulata*, which may be identical with *Th. mutans*. [The nature of the organism appears to have been determined by its morphological appearance and, in view of the high mortality recorded and the high percentage of corpuscular infection, full investigations into its identity seem indicated].—U. F. Richardson.

Mary, A. (1935). Une enzootie de *Gallziekte* au Togo. [**An Enzootic of " Gallziekte " in Togoland**].—*Rec. Méd. vét. exot.* **8.** 23-24.

This article records an outbreak of gall-sickness in a herd of cattle moved from the interior of the colony to the coast. The mortality was about 90 per cent., *Anaplasma marginale* and *A. centrale* occurred in large numbers in the blood, and the principal symptoms were jaundice and oedema of the neck. The spleen was enlarged and the liver soft and yellow in colour with dark red patches. A goat inoculated with blood from an infected animal developed fever and died on the seventh day without the appearance of anaplasms. Local cattle pastured on the same land did not develop the disease. It was thought that the disease was an anaplasmosis transmitted by *Rhipicephalus simus* to the non-immune cattle from the interior, the local cattle being immune.—U. F. Richardson.

Hindle, E. (1935). **Relapsing Fever : Some Recent Advances.**—*Trop. Dis. Bull.* **32.** 309-327. [167 refs.]

This review covers the advances made in the last five years in the knowledge of human spirochaetosis. Whilst there has been a decrease in the incidence of the disease in Europe and North Africa, an extensive and deadly epidemic has swept across equatorial Africa, and the disease has been recorded for the first time in the United States of America and Canada. Various strains of spirochaetes pathogenic for man have been isolated from rodents, foxes and jackals in Africa and, in Panama, parasites apparently identical with those of man have been isolated from monkeys, calves and horses. Various new species of *Ornithodorus* have been proved to transmit the disease, and the dog tick, *Rhipicephalus sanguineus* and the Canadian wood tick have come under suspicion.

In the realm of chemotherapy, important information has been gained as to the influence of the defence mechanism on the action of drugs and exposure to ultra-violet rays has been found to exert a beneficial effect on the sterilizing power of " salvarsan ".

Studies on immunity have revealed the different characteristics of original and relapse strains, and the complication of research by their production of different antibodies. It is interesting to note that the fresh sera of cattle, sheep and goats have been found to possess a spirochaetocidal property which disappears on inactivation.

Other points of interest dealt with include the study of residual brain infections, the influence of spirochaetal infection on the body defences against trypanosomes, and the study of the ultravisible stage of the parasites in cultures, ticks and the vertebrate host.—U. F. Richardson.

Ripley, H. S., & van Sant, Helen M. (1934). **Rat-Bite Fever acquired from a Dog.**—*J. Amer. med. Ass.* **102.** 1917-1921. 3 figs., 1 table. [33 refs.]

A report on two human cases of rat-bite fever, each of which was apparently acquired through a wound infection when handling dogs. Blood from these patients was inoculated into guinea pigs, mice and dogs with positive results, *Spirochaeta* (*Spirillum*) *morsus-muris* being recovered in each instance. The course of the disease was controlled by injections of arsphenamine.—R. E. Glover.

DISEASES CAUSED BY VIRUSES.

Tang, F. F., Wei, H., McWhirter, D. L., & Edgar, J. (1935). **An Investigation of the Causal Agent of Bovine Pleuropneumonia.**—*J. Path. Bact.* **40.** 391-406. 20 figs. on 4 plates, 5 tables. [9 refs.]

Five strains of the " virus " were isolated from a local outbreak by methods of plating, dilution and filtration. The first two methods, although simple, were not always satisfactory. The filtration method gave the best results particularly with contaminated material. The five isolated strains were compared with three strains from a foreign source.

Bennett's broth was used as a basic medium and used in a fluid form or made semi-solid or solid by the addition of agar. 10 per cent. horse serum was added as a routine to all media.

In broth seeded with lymph filtrate, growth was apparent after one to two days' incubation. Colonies first appeared as islands, then as threads, followed by general cloudiness. A heavy inoculum yielded only a general cloudiness. When old cultures were sub-cultivated, no matter how small the inoculum, only a cloudiness developed.

In semi-solid media, colonies could be observed by dark ground illumination and consisted chiefly of rings and granules. Colonies of fresh strains had a more filamentous appearance due to a peripheral zone of radiating filaments.

The authors conclude that in old strains the reproduction is by simple budding whereas in freshly isolated strains five stages may be described :– (1) the resting stage or stage of elementary bodies, consisting chiefly of rings and granules : when abundant these forms cause cloudiness ; (2) the filamentous stage, in which filaments grow from the elementary bodies ; (3) the stage of ramification, consisting of branching and sub-branching of filaments ; (4) the stage of chain formation, due to the consolidation of protoplasm in the filaments, and (5) the stage of disintegration, in which the chains are broken up progressively into elementary bodies, thus completing the cycle.

The "virus" was bile-soluble, fermented glucose, fructose, maltose, mannose, sucrose, trehalose and dextrin and, when fresh, reduced haemoglobin. Goats and

water-buffaloes were susceptible to artificial infection but laboratory animals were refractory. All the strains appeared to be serologically identical.

—Gwilym O. Davies.

Potaroff, A. S. (1934). **Formolized Vaccine against Contagious Bovine Pleuro-Pneumonia.**—*Sovyet. Vet.* No. 11. pp. 33-36. [Abst. from French summary].

The author prepared a formolized vaccine as follows :– sterile pleuro-pneumonia lymph, diluted with an equal amount of physiological saline, was mixed thoroughly and then refrigerated for 24 hours, to obtain a homogeneous suspension. It was then divided into four parts, and 37 per cent. formaldehyde solution added in concentrations of 0·1, 0·25, 0·5, and 0·75 per cent., each being then well shaken and refrigerated for three more days. Each was then tested for bacterial contamination.

The author favours the use of a 0·5 per cent. concentration of formalin, in a dose of 4 c.c. of vaccine for adult and 2 c.c. for young cattle, given subcutaneously in the neck. Results were equal to those obtained with live vaccine. No complications arise, and no virus carriers are created. He considers that the method should be largely used as a prophylactic measure.—C. V. Watkins.

Mettam, R. W. M. (1934). **Rinderpest.**—*Rep. vet. Dep. Uganda. 1933.* pp. 32-34. 1 table, 1 chart.

During the year, 7,509 litres of antirinderpest serum were prepared from animals hyperimmunized by the intravenous injection of a litre of citrated virulent blood, symptoms of shock being treated by the intravenous injection of 5 c.c. of a 1 : 1,000 solution of adrenalin. " Previous to the use of adrenalin the mortality of serum makers undergoing hyper-immunisation was less than 5 per cent., but since the introduction of this drug the mortality has become negligible." During the " rush " period of serum preparation, it was found impracticable to carry out Jacotot's method of reinforcing immunity by the injection of virulent spleen pulp which, at ordinary times, was used as a routine in hyperimmunization. An average dose of 75 c.c. of serum was used for the double inoculation of highly susceptible cattle in the field with a resulting mortality of 12 per cent. – mainly calves and drought-stricken animals. This is considered satisfactory as an average dose of 125 c.c. of [imported] serum had been found necessary during previous years.

Vaccines have given unsatisfactory results up to the present in field operations, but encouraging results were obtained at the laboratory with a vaccine prepared by grinding up spleen pulp with two volumes of sand, and adding an equal volume of 1 per cent. sodium tauroglycocholate, then three volumes of normal saline, and sufficient formol to make a final dilution of 1 : 1,000. Two cases are recorded of animals which failed to react to double inoculation following previous vaccination, but contracted rinderpest and died in the process of hyper-immunization. A small-scale experiment, on the immunity of calves suckling immune mothers, showed that all the animals were susceptible, and fatal disease occurred in two calves which were only one week old.—U. F. Richardson.

Kerr, P. J. (1935). **The Use of Goat Tissue Vaccine for the Control of Outbreaks of Rinderpest in Bengal.**—*Indian J. vet. Sci.* **5.** 67-89. 18 graphs. [1 ref.]

This article describes the method of preparation of goat tissue rinderpest vaccine as carried out in Bengal, and records the vaccination of 100,000 animals, with details of the reactions and mortality in 45,148 animals which were kept under accurate observation.

The spleens of some goats weigh as much as 40 g. The spleens of reacting goats are removed and cut into pieces of 1 g. in weight which are placed in glass ampoules, sealed in a flame and stored at 45°F. This material kept satisfactorily for 30 days at 45°F., and for six days after removal from cold storage. Potency was reduced on the seventh day, and was rapidly lost on exposure to sunlight or excessive heat. One failure of immunization is recorded with the use of vaccine seven days after issue, and another during hot weather when the shade temperature was about 108°F. The infected spleen is used as a 1 per cent. emulsion in 0·5 per cent. saline solution, and is given in doses of 1 c.c. to cattle and 0·5 c.c. to buffaloes. A loss of only 0·6 per cent. is recorded in cattle inoculated in the field, but no information is given as to whether it was satisfactorily established that the 42,838 animals which gave no definite reaction had all acquired an efficient immunity.—U. F. RICHARDSON.

HAJI, C. S. G. (1935). **A Brief Report on Goat Virus Inoculation against Rinderpest, Performed at Balishah, District Dadu, Sind.**—*Indian vet. J.* **11.** 259-262. 4 tables.

277 cattle and buffaloes were inoculated with goat virus obtained from local goats reacting to the injection of goat virus obtained from Muktesar. Mild temperature reactions, insufficient to prevent work, were recorded, but no mortality occurred. A herd of 24 in-contact cattle which were not inoculated did not contract rinderpest.—U. F. RICHARDSON.

STEWART, J. L. (1935). **" Immune " Cattle Plague Antiserum Manufactured in the Field.**—*J. comp. Path.* **48.** 117-124. 3 tables. [1 ref.]

This article records observations on the manufacture and the standardization of potency of anti-rinderpest serum obtained in the field from animals reacting to a double inoculation. In the earlier inoculations attempts were made to draw serum from animals which had suffered a severe reaction at the time of their own immunization, the severity of the reaction being judged by the severity of the clinical symptoms. It was decided that the titre of the serum obtained in this way was too irregular to be satisfactory, but on adopting a method of selecting healthy adult animals at the time of immunization, and only using for serum production those which showed a severe febrile reaction, it is believed that a standard serum can now be produced. Many thousands of cattle have been treated with field serum since this method was adopted and, except for two or three herds, the mortality has been under 2 per cent.

" The rise of temperature found to be the best for the manufacture of field serum begins on the fifth or sixth day after immunisation and rises gradually until the temperature is at its height during the seventh and eighth days, thereafter gradually falling by lysis."

Details are not given as to the actual dose of serum used, as that varied from one part of the country to another, although the value of the serum remained constant from whatever area it was drawn. For zebu cattle the titre of field serum is stated to be 10 to 15 c.c. per 100 lb. body weight, being much the same as Nigerian laboratory serum for the same breed of cattle.—U. F. RICHARDSON.

BANERJI, P. C., & MOHAIN, R. N. (1935). **The Permeability of the Goat's Placenta to Rinderpest Virus.**—*Indian J. vet. Sci.* **5.** 64-66. [13 refs.]

This article records the detection of rinderpest virus in a mixture of the spleen and blood of a foetus aborted by a goat a week after inoculation with a strain of " goat-adapted " rinderpest. Two clean goats reacted to subcutaneous

inoculation of a saline emulsion of foetal material and two bulls developed a rinderpest reaction on inoculation with splenic material from one of the goats. —U. F. Richardson.

Striegler, E., & Nagel, H. C. (1935). Virulenz, Infektiosität und immunisierende Eigenschaften des Virus der Maul- und Klauenseuche bei der Vermehrung in Gewebekulturen. [**Virulence, Infectivity and Immunizing Properties of Foot and Mouth Virus Grown in Tissue Culture**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 71-76. 4 tables. [9 refs.]

Types A, B and C of the virus of foot and mouth disease were passed through 50 subcultures and the greatest degree of multiplication occurred in media containing plasma or serum. Type A was infective only at the comparatively low titre of 1 : 9,000 to 1 : 25,000, but the majority of experimental animals succumbed to a generalized manifestation of the disease when infected with this type of virus. After 40 to 50 subcultures only 7 per cent. of guinea pigs showed any local lesions. Type C, on the contrary, was infective at titres of 1 : 36,000 to 1 : 76,000, but after 40 to 50 subcultures as many as 82 per cent. of guinea pigs showed local lesions only. Type B lay intermediate between A and C in these respects.

Generalized infection was followed by the production of a strong immunity against the homologous type in 80 to 90 per cent. of cases. Localized infection was followed by immunity in 50 per cent. of cases. With neither generalized nor local infection was there significant difference between the three virus types. There was no significant production of immunity against the heterologous virus types.—E. J. Pullinger.

Schmidt, W. (1935). Klinische, anatomische und histologische Untersuchungen von Ochsenherzen bei gutartigem Verlauf der Maul- und Klauenseuche. [**Clinical, Anatomical and Histological Studies of the Heart in Foot and Mouth Disease**].—*Arch. wiss. prakt. Tierheilk.* **69.** 24-32. 3 figs. [16 refs.]

Changes are frequently observed in the myocardium of cows, pigs and goats which have died from an acute type of foot and mouth disease. These lesions have been described by a number of workers, and are essentially degenerative in character. Sudden death in such cases is due to heart failure. The author points out that, in a more mild type of infection, heart lesions are more common than is generally believed.

In an extended series of examinations of infected bovines the following observations were made on the heart. No macroscopic or microscopic lesions were observed in the hearts from animals which had shown no cardiac symptoms during life. In other animals which had suffered from cardiac disturbance, definite lesions were observed *post mortem*. These changes were most frequently present in the left ventricular wall and the septum, and consisted essentially of multiple foci of atrophy and degeneration of muscle fibres, scanty fatty deposits and cell infiltration in and around such areas. Later development of the lesions showed that there was a tendency towards fibrosis with myocardial scarring. —J. R. M. Innes.

Frenkel, H. S. (1934). Is de mol (Talpa europaea) voor kunstmatige besmetting met mond- en klauwzeervirus vatbaar? [**Susceptibility of Moles to Foot and Mouth Disease**].—*Versl. werkzaam. Staatsveearts. Onderzoek.-inst. 1933-34.* pp. 84-87. [English, French and German summaries : abst. from orig.]. [Also appeared in *Tijdschr. Diergeneesk.* **62.** 466-468].

The susceptibility of the mole to foot and mouth disease was tested with

negative results. The author considers that this animal is, therefore, not concerned in the transmission of foot and mouth disease.—J. E.

LAIDLAW, P. P. (1935). **Epidemic Influenza: A Virus Disease.**—*Lancet.* **228.** 1118-1124. [18 refs.]

The article commences with a general review of influenza. This is followed by a description of experiments on the transmission of an infectious agent to the ferret and the mouse, details of which have already been published [this *Bull.* **4.** 357. and **5.** 137].

During 1934, an endeavour was made to obtain further strains of the virus. In one outbreak, which on clinical grounds was typical of influenza, no virus was obtained but, in another, strains were recovered from four out of six specimens. It has also been shown that the virus isolated from Porto Rico by FRANCIS is identical with the English strain, although it produced more extensive pulmonary lesions in ferrets and was more rapidly fatal for mice. All the strains so far examined have been neutralized by one specific antiserum.

The article concludes with a discussion on the possible relationship between human and swine influenza.—R. E. GLOVER.

—. (1935). **Discussion of Influenza in Man and Animals.**—*Proc. R. Soc. Med.* **28.** 941-950. [20 refs.]

In opening this discussion ANDREWES pointed out that, whereas the nature of human and swine influenza had been definitely established by experimental means, it had yet to be shown that so-called influenza in other animals, such as the horse, was definitely related to these conditions. He then gave a brief description of the experimental disease in ferrets and mice in which bacteria-free filtrates of either the human or porcine strains were capable of inducing the whole disease picture. In pigs, on the other hand, he drew attention to the observation that the inoculation of virus alone produced a mild condition, the combination of virus plus *Haemophilus influenzae* being required to reproduce the clinical picture of swine influenza. With human influenza a virus immunity was observed in recovered ferrets for a period of about three months, after which it gradually waned. It was noted, moreover, that, in ferrets inoculated subcutaneously with virus emulsions, neutralizing antibodies might develop in the serum, although the animals were not completely resistant. Antibodies were demonstrable in most samples of human serum.

EDWARDS drew attention to an important series of investigations undertaken by KOCH, GAFFKY, LÖFFLER and LÜHRS. These reports dealt with the respiratory condition in horses known as "equine infectious pneumonia" (influenza pectoralis). According to the German workers, this disease is an influenza-like condition and should be distinguished from "pink eye" (influenza catarrhalis), which is commonly designated equine influenza. It is pointed out that influenza catarrhalis occurs in the form of extensive epizootics and can be readily transmitted by the subcutaneous inoculation of blood from infected horses, whereas influenza pectoralis is less rapid in its spread and is not usually recognized until it has reached the stage of a definite pleuro-pneumonia. Many organisms isolated from outbreaks of the latter condition have been tested on horses, but none has been definitely incriminated as the primary cause of the disease.

The German investigators have shown, however, that bacteria-free bronchial exudates applied to the nasal mucosa of young horses have invariably set up a disease of the broncho-pneumonic type. Such emulsions, when inoculated by other routes (subcutaneous, etc.), failed to induce any clinical symptoms, but were

capable, nevertheless, of affording a protection against infection by the nasal passages. It is of interest that LÜHRS failed to infect pigs with the virus of influenza pectoralis.

It can thus be seen that the three influenza-like viruses of human, porcine and equine origin are all apparently transmitted only by way of the respiratory mucosa. Their pathogenicity can be enhanced by association with various secondary organisms and they afford some degree of immunity when introduced by other routes.

Subsequent speakers discussed the relationship of influenza to other virus diseases.—R. E. GLOVER.

ALEXANDER, R. A., & VAN DER VYVER, B. (1935). **Horsesickness. Field Experiments with Neurotropic Vaccine during the Season 1933-34.**—*J. S. Afr. vet. med. Ass.* **6.** 33-38. [1 ref.]

The experiments here recorded were carried out in order to get an idea as to the efficacy of the neurotropic mouse brain vaccine under field conditions before issuing it on a large scale. 171 horses and 28 mules were inoculated in the Pretoria district in the season 1933 to 1934, using a dose of 10 c.c. of a 1 per cent. emulsion of mouse brain or 0·2 per cent. of guinea pig brain, made up in a 10 per cent. horse serum saline mixture. Three horses died shortly after inoculation, but it was doubtful whether the vaccination was responsible. The 15 per cent. mortality in the vaccinated horses on exposure to natural infection was probably due to their only having been immunized against one strain of horse-sickness. The mortality was mainly in the group treated with one strain only as, where two strains were used, it was only 2 per cent.—E. M. ROBINSON.

NIESCHULZ, O., BEDFORD, G. A. H., & DU TOIT, R. M. (1934). **Investigations into the Transmission of Horsesickness at Onderstepoort during the Season 1931-1932.**—*Onderstepoort J. vet. Sci.* **3.** 275-334. 3 figs. [8 refs.]

The investigations recorded in this paper were carried out in the attempt to discover the insect vector responsible for the transmission of horse-sickness. A review of the previous work in this connection is given and the earlier theories on the epidemiology of the disease are mentioned, such as the dew theory, toxin in marsh grass, association with morning and evening mists, etc.

The experiments were very adversely influenced by the exceptionally dry summer conditions prevailing. A great deal of time had to be devoted to developing special technical methods for handling and maintaining the various species of mosquitoes. The authors consider that a possible explanation of their failure to transmit the disease was that the work was mainly carried out with a strain of horse-sickness virus which had been maintained in horses for years by subinoculation of blood.

As a result of a mosquito survey carried out at Onderstepoort, it was thought that the most likely transmitters would be certain *Aëdes* types. Crushed mosquitoes of various types were inoculated into horses at various periods after feeding and it was shown that the virus could persist in certain species for up to a week. The transmission experiments by allowing mosquitoes to bite were uniformly negative. The species in which the virus persisted were *A. caballus*, *A. lineatopennis* and *A. hirsutus*. The tentative conclusion arrived at was that the *Aedes* species are probably not the transmitters of horse-sickness under natural conditions.—E. M. R.

BALOZET, L. (1934). Au sujet de l'immunité dans l'anémie infectieuse des équidés. **[Immunity to Equine Infectious Anaemia].**—*C. R. Acad. Sci. Paris.* **198.** 992-998. [1 ref.]

This article is a record of inoculation experiments carried out with two strains of the virus of equine infectious anaemia, viz. a weak strain obtained from Morocco (designated " T.B.") and a more active strain obtained in France (designated " Alfort ").

The author inoculated a donkey with the former virus, recovered it and passed it through a second donkey. Both reacted and survived. The " Alfort " strain was then inoculated into the second donkey which died as a result.

The author concludes that no protection or tolerance to the stronger strain was induced as a result of previous infection by the weaker strain.—C. DAVENPORT.

BALOZET, L. (1935). Sensibilité de l'âne africain à l'inoculation du virus de l'anémie infectieuse. [**Susceptibility of the African Donkey to Equine Infectious Anaemia**].—*C. R. Soc. Biol. Paris.* **119.** 62-65.

In this article is demonstrated the value of the small African donkey for experimental laboratory work in connection with equine infectious anaemia. The author finds the degree of susceptibility shown by this animal to experimental inoculation equal to that of the horse, notwithstanding popular beliefs to the contrary. The reaction of the donkey to inoculation, the blood changes which follow infection and the lesions found *post mortem* are described.—C. DAVENPORT.

BALOZET, L. (1935). Effet des passages successifs, par les ânes, sur le pouvoir pathogène du virus de l'anémie infectieuse. [**Effect of Donkey Passage on the Virus of Equine Infectious Anaemia**].—*C. R. Soc. Biol. Paris.* **119.** 65-67. 1 table. [1 ref.]

This paper is a short discourse on the effect of repeated passage through the donkey of strains of the virus of equine infectious anaemia. The author finds that the effect is similar to that obtained when the horse is used, namely, exaltation of virulence up to the fourth passage and subsequently no special modification. A weak virus treated in this manner thus loses its benign characteristics.—C. D.

SCHAAF, J., HECKE, F., & BERT, F. (1935). Herzmuskelveränderungen bei der ansteckenden Blutarmut der Pferde. [**Myocardial Lesions in Equine Infectious Anaemia**].—*Z. InfektKr. Haustiere.* **47.** 178-194. 10 figs. [14 refs.]

Myocardial lesions are commonly seen, and are of diagnostic significance. Two different types can be distinguished :– (a) multiple focal areas of degeneration with a marked inflammatory reaction, and (b) larger white areas to be seen by the naked eye, which are in the nature of anaemic infarcts. Scar tissue may form in both types. Clinically, the lesions are responsible for severe cardiac disturbances.
—J. R. M. INNES.

MEYER, K. F., WOOD, F., HARING, C. M., & HOWITT, B. (1934). **Susceptibility of Non-immune, Hyper-immunised Horses and Goats to Eastern, Western and Argentine Virus of Equine Encephalomyelitis.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 56-58. [3 refs.]

The eastern virus causes fatal disease in horses when inoculated by the intracerebral, the intravenous and the intracutaneous routes, while the western and the Argentine viruses were found to produce a fatal illness by the intracerebral route only.

Horses hyperimmune to the western virus did not resist infection by the eastern virus introduced intracerebrally, but only showed slight transitory febrile reactions when this virus was inoculated intracutaneously ; such hyperimmune

horses were unaffected by the Argentine or western viruses, even when these were introduced intracerebrally.

The eastern virus protected horses against intracerebral inoculation of the western virus.

All three viruses, injected intracerebrally into goats, may produce a transitory or a rapidly fatal encephalitis.—A. Brownlee.

Shahan, M. S., & Giltner, L. T. (1934). **Some Aspects of Infection and Immunity in Equine Encephalomyelitis.**—*J. Amer. vet. med. Ass.* **84.** 928-934. 2 tables. [10 refs.]

Discussing natural infection, the authors report positive results of transmission between guinea pigs by *Aedes*, confirming the work of Kelser [this *Bull.* **4.** 107]. They were, however, unable to obtain similar results with horses. Intradermal injection into guinea pigs of mosquitoes caught on infected premises were also negative.

Infection *via* the nose does not occur in nature, but has been reported experimentally. Experimental infection through a scarified tongue has succeeded in a minority of cases only. The epidemiology of the disease still remains obscure.

Encouraging results have been obtained with a formol-killed vaccine in guinea pigs and horses, but further work is necessary before a reliable vaccine can be produced.—J. E.

Madsen, D. E., & Knowlton, G. F. (1935). **Mosquito Transmission of Equine Encephalomyelitis.**—*J. Amer. vet. med. Ass.* **86.** 662-666. 1 table. [3 refs.]

Aedes nigromaculis, collected as adults, were allowed to feed on guinea pigs at varying intervals after these had been inoculated intracerebrally with equine encephalitis virus (identical with the so-called " western " type of equine encephalomyelitis virus) received from horses affected in the 1934 outbreak in Cache County, Utah. The mosquitoes were then allowed to feed on healthy guinea pigs. The disease was set up in this way in different experiments in two guinea pigs and confirmed by passage into horses.

In a similar experiment, using *A. dorsalis*, guinea pigs were possibly infected, but this was not confirmed in horses. Many other attempts, using *A. dorsalis*, yielded negative results, failure being attributed to the inability to keep the mosquitoes alive and vigorous for a sufficiently long time to allow of virus multiplication within their tissues.

Attempts at mosquito transmission of the disease from natural cases in the horse were unsuccessful, possibly due to the virus having disappeared from the blood by the time these cases were obtained.—A. Brownlee.

Rivers, T. M., & Schwentker, F. F. (1935). **Encephalomyelitis accompanied by Myelin Destruction experimentally produced in Monkeys.**—*J. exp. Med.* **61.** 689-702. 3 plates, 2 tables. [16 refs.]

Aqueous emulsions and alcohol-ether extracts of normal rabbit brain were made and injected intramuscularly into eight healthy monkeys kept under healthy conditions. The monkeys received three inoculations weekly. The number of inoculations per animal varied from 46 to 85, depending upon the time of the onset of symptoms. Eight control monkeys, receiving no inoculations, were otherwise kept under the same conditions. In six of the eight inoculated monkeys, ataxia and paralysis, involving the muscles of the face and head, became manifest. Histological changes were found in the brain of seven of the inoculated monkeys, the cerebellum and pons being most affected. Glial proliferation and infiltration

of mononuclear cells and polymorphonuclear eosinophiles occurred around the blood vessels. Foreign body giant cells and compound granular corpuscles were often found. All parts of the brain showed destruction of myelin, much of which was perivascular.

Cultural and staining methods did not reveal the presence of micro-organisms in the tissues, and inoculation of emulsions of brain from these monkeys into monkeys, rabbits, guinea pigs and mice did not set up any disease conditions. The controls showed no disease symptoms and the brains of four of them, examined histologically, were found to be normal.—A. BROWNLEE.

ROSS, V. (1934). **Experiments to Produce Immunity to Canine Distemper in Ferrets.**—*J. Amer. vet. med. Ass.* **85.** 592-595. [2 refs.]

The author describes the results obtained from the simultaneous injection of ferrets with living canine distemper virus and concentrated antiserum, and also the use in a similar manner of virus and unconcentrated antiserum.

Attention is drawn to the fact that when the animals are in contact with infection it is not possible to distinguish between failure of serum to protect against the virus injected and failure to protect from virus received casually from diseased controls. In contrast to earlier experiments on similar lines, the ferrets that had received serum and virus were not exposed with the controls, unless those controls that had received virus alone were actually ill.

Ferrets received unconcentrated serum and desiccated virus, concentrated serum and desiccated virus and concentrated serum and spleen emulsion.

In all, 23 ferrets were used, the only ones surviving being those two that received concentrated serum and spleen emulsion. The author considers that the deaths were due to exposure to infection from sick controls rather than to the failure of the serum to protect against the virus given along with it. [This does not appear to be substantiated by the results of experimental work described in the text].—G. F. BODDIE.

WATSON, E. A., PLUMMER, P. J. G., & WEST, J. R. (1934). **Distemper Research.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 47-50. 1 table.

This is a continuation of the previous year's work [this *Bull.* **5.** 134].

Large numbers of experimental animals are necessary for this work, as ferrets or fitch used as reservoirs for virus only survive for about two weeks after infection. Large police dogs are used for the production of antiserum, a large stock of which is available for use in the field. Dog and fox puppies are used for immunity trials.

Ferrets have proved to be very suitable for work with distemper virus originating from dogs, foxes and mink, though the mink virus was lost at the 20th passage. The clinical and *post-mortem* picture of distemper in the ferrets is given in detail.

A further interesting finding was that canine distemper antiserum was valuable in the prophylactic treatment of fox encephalitis, which, in the opinion of ALLEN (Pathologist in Charge, Fur and Game Animal Research, Manitoba) is merely the early stage of distemper, as foxes not becoming affected until the end of an outbreak survive long enough to develop the typical catarrh and diarrhoea of distemper.—J. E.

REMLINGER, P., & BAILLY, J. (1935). Quelques remarques relatives aux vaccinations antirabiques vétérinaires. [**Some Notes regarding the Antirabic Inoculation of Animals**].—*Bull. Acad. vét. Fr.* **8.** 242-245. [1 ref.]

This paper is a discourse on the value of prophylactic antirabic inoculation in animals. The authors point out that the procedure is still forbidden in France,

notwithstanding the success attending its use in certain French colonies. They give a list of the inoculations carried out in Morocco during the years 1928 to 1934. In all 6,850 animals of various species were vaccinated, 739 of them in consequence of having been bitten. An ether-attenuated virus is employed.

The latter half of the paper is devoted to a justification of the price at which the vaccine is sold and the size of the dose for the larger animals.

The authors find that the incidence of the disease is higher and the incubation period shorter in the bovine species than in the equine. This they ascribe to the fact that the former stand and lower the head in defence whereas the horse, mule and donkey turn and kick. Thus bites of the muzzle and head occur more frequently in bovines and bites of the limbs more commonly in equines.—C. D.

NEITZ, W. O., & THOMAS, A. D. (1934). **Rabies in South Africa. Occurrence and Distribution of Cases during 1933.**—*Onderstepoort J. vet. Sci.* **3.** 335-342. 3 tables, 1 map. [6 refs.]

The authors discuss the increased incidence of rabies in South Africa in 1933, which they attribute to the drought conditions which prevailed up to November of that year, causing migration of the small wild carnivora (Viverridae). An increased incidence was noticed in human beings and domestic animals. A lessened incidence, as a result of the heavy rains, was predicted. An outbreak of rabies in calves in close proximity to some meercat colonies is described. Tables describing the cases investigated are given, together with a map showing the infected areas.—E. M. ROBINSON.

—. (1935). Editorial. [**Rabies in Cuba**].—*Bol. mens. Col. vet. nac. Havana.* **5.** 989-990. [In Spanish].

The epidemic of rabies in Cuba is becoming serious. In two months, 24 out of 168 suspected cases were diagnosed as positive at the Finlay Institute, while 91 persons who had been bitten applied for treatment at the Department of Health. These figures do not include cases in the interior of the island.

It is considered that the control of all prophylactic measures should be centralized, instead of being divided between the Ministry of Health and the municipal authorities. Otherwise, the existing legislation should be sufficient for the control of rabies, as it requires :- (1) municipal tax on dogs ; (2) seizure and destruction of all stray dogs ; (3) use of muzzles and chains ; (4) compulsory notification ; (5) control at ports, and (6) compulsory vaccination of all dogs. Unfortunately the legislation is not always strictly adhered to and the Health Department should be compelled to see that the law is carried out.

MANOUÉLIAN, Y. (1935). Rage, maladie de Borna et neurones périphériques [**The Peripheral Neurones in Rabies and Borna Disease**].—*C. R. Acad. Sci. Paris.* **200.** 862-863.

In rabies, an examination of certain organs which are known to be virulent (salivary glands, etc.) fails to reveal Negri bodies in the parenchymatous cells, but they may be readily found in the intraglandular and periglandular nerve cells. Similarly, in experimental Borna disease, the intranuclear inclusion bodies of Joëst, which are not seen in the organs, can be demonstrated in the associated nervous tissue. According to the author, in both diseases the infectivity of the salivary and other secretions is probably due to contamination with liberated, infective neurones.—R. E. GLOVER.

Nikolić, M. (1935). Neinfekcioznost cerebrospinalnog liquora kod infekciozne bulbarne paralise. [**Non-Infectivity of Cerebrospinal Fluid in Aujeszky's Disease**].—*Vet. Arhiv.* **5.** 1-2. [2 refs.] [Abst. from German summary].

The cerebrospinal fluid removed from four rabbits at the height of experimentally produced Aujeszky's disease proved to be non-infective for eight normal rabbits by subdural injection in a dose of 0·2 c.c. Blood or brain from the same animals was, however, infective.

The author supposes that the reason for this is the fact that Aujeszky's disease virus attaches itself to tissue cells such as blood corpuscles or brain cells and does not occur in cell-free cerebrospinal fluid.—J. E.

I. Green, R. G., Ziegler, N. R., Carlson, W. E., Shillinger, J. E., Tyler, S. H., & Dewey, E. T. (1934). **Epizootic Fox Encephalitis. V. General Pathogenic Properties of the Virus.**—*Amer. J. Hyg.* **19.** 343-361. 7 tables. [8 refs.]

II. Green, R. G., & Shillinger, J. E. (1934). **Epizootic Fox Encephalitis. VI. A Description of the Experimental Infection in Dogs.**—*Ibid.* 362-391. 10 figs., 10 tables. [8 refs.] [For absts. of previous articles of this series, see this *Bull.* **2.** 290, **3.** 136, and **4.** 349].

I. The virus is rather resistant and can be obtained from the central nervous system several days after death : it can be kept for years in 50 per cent. glycerol. It is easily filtrable and, when introduced by appropriate methods, always produces the specific disease in susceptible animals, which include dogs. [Workers of the Veterinary Department, Canada, consider this virus to be extremely closely related to that of canine distemper – see Watson, Plummer, & West, p. 718].

In this section of the authors' work, coyotes were chiefly used for experimental infection : the results are given in detail. The grey fox, mink, rabbit, white rat, grey squirrel, guinea pig, cat, ferret, sheep and monkey were found to be insusceptible. The authors lay stress on the importance of the presence of specific inclusion bodies, which were characteristic of fox encephalitis, in the experimental animals as evidence that they were really infected.

II. A long series of case records with general considerations. Most dogs were susceptible, but some were apparently immune. In fatal cases, the disease ran a violent course of about one week, as in foxes. Dogs showed a profuse nasal and lachrymal discharge, which usually became purulent ; there was nervous excitement followed by coma and death. Convulsions were not commonly seen.

The *post-mortem* findings included a cellular infiltration of the central nervous system and focal necrosis of the liver. Intranuclear inclusions were found in the central nervous system and elsewhere in several body organs, notably in the vascular endothelium of the body as a whole.—J. E.

Leleux, J. (1934). Traitement et prophylaxie de la variole du pigeon et de la poule. [**Treatment and Prevention of Fowl and Pigeon Pox**].—*Thesis for Docteur vétérinaire, Alfort.* pp. 54. [45 refs.]

This thesis describes the forms of fowl pox and discusses the methods of dealing with the disease.—J. E. Wilson.

Fukushima, T. (1934). Zur Kenntnis der Hühnerpestpathologie. (Zugleich ein Aufschluss über die in Korea auftretenden Hühnerseuchen). [**The Pathology of Fowl Plague, and the Epizootics Occurring in Korea**].—*9th Rep. Govt. Inst. vet. Res. Fusan, Japan.* Pt. 2. pp. 64-77. 9 figs. on 2 plates, 5 tables. [18 refs.] [In German : Japanese summary Pt. 1. p. 136].

This is a study of the lesions caused by viruses of the fowl plague and New-

castle types. Two kinds of lesion are differentiated ; one affects the nervous system, the other is characterized by inflammatory lesions in the organs, particularly the spleen. The neurotropic portion of the virus appears to require longer to establish itself than the organotropic part ; therefore, in animals which succumb shortly after infection, organotropic changes are more in evidence than neurotropic ones, while after more prolonged incubation neurotropic lesions are the more prominent.

Summing up, the author has tabulated the viruses according to their incubation period and pathology. In the first group, typified by the " Chiba " strain, the incubation period is not more than two days and the lesions caused are mainly organotropic. In the second group, a mixture of organotropic and neurotropic lesions occur after an incubation period of three to ten days ; Newcastle, Ranikhet, Philippine, Batavian, Egyptian, and certain Japanese and Korean viruses are included here. A third group is suggested for cases where the incubation period is very long, and neurotropic lesions alone are found.—Norman Hole.

Fukushima, T., & Shimomura, K. (1934). Beiträge zur pathologischanatomischen Kenntnis der *Farinasschen Avianpest*, insbesondere zur Vergleichung mit solchen wie der in Korea auftretenden Hühnerseuche. [**The Pathology of Farina's Fowl Plague compared with Korean Fowl Plague**].—*9th Rep. Govt. Inst. vet. Res. Fusan, Japan.* Pt. 2. pp. 59-63. 1 table. [5 refs.] [In German : Japanese summary Pt. 1. pp. 135-136].

The lesions caused by the virus of Korean " fowl plague ", and those by the virus of Farina's " fowl plague " [Newcastle disease] are compared histologically ; they are essentially the same, the only difference noted being in the severity of the changes in spleen and brain tissues. The splenic changes, however, appear to depend upon the incubation period, and with both diseases these lesions were found to be more severe when the incubation period was short.—Norman Hole.

Nakamura, J., Oyama, S., Fukusho, K., & Tomonaga, N. (1934). Vergleichende immunbiologische Untersuchungen des Korea Hühnerseuchenvirus und des japanischen Geflügelpestvirus. Zugleich über die Beziehung zum Virus der Newcastle Disease. [**Immunological Comparison of Korean and Japanese Fowl Plague Viruses : Relation to Newcastle Disease**].—*9th Rep. Govt. Inst. vet. Res. Fusan, Japan.* Pt. 2. pp. 78-85. 5 tables. [9 refs.] [In German : Japanese summary Pt. 1. pp. 136-137].

Four viruses causing plague-like diseases in poultry have been examined. Birds were hyperimmunized against each virus and cross tests were carried out of the neutralizing power of the hyperimmune serum of each strain for the other strains. The resistance of immunized fowls to the other viruses was also determined. The Korean, the Philippine and the Japanese strain " Sato " were found to be immunologically identical, and to resist inoculation with Newcastle virus. The Japanese strain " Chiba ", with a shorter incubation period than the rest, was allied to fowl plague on clinical grounds. The difference in incubation period was not so apparent, however, where minimal infective doses were used, but the duration of incubation after a massive dose did not influence the titre of the virus.
—Norman Hole.

Schalm, O. W., & Beach, J. R. (1935). **The Resistance of the Virus of Infectious Laryngotracheitis to Certain Physical and Chemical Factors.**—*J. infect. Dis.* **56.** 210-223. 6 tables. [9 refs.]

The available literature is cited and the technique employed detailed. The

virus was found to remain alive in dead birds for 22 hours at 37°C., for ten days at room temperature and for 30 days in the refrigerator, death of the virus coinciding with the onset of decomposition.

When the tracheal exudate was removed and kept at room temperature, which was arranged to approximate that of a hen-house, a gradual deterioration of the virus was noted, and after about 100 days it was incapable of setting up the disease. The effect of sunlight on the virus is detailed and also the effect of glycerin, to which the virus appeared to be resistant. The influence of temperature on the viability of the virus in desiccated exudate and in glycerin suspension was studied ; also the longevity of the virus under these conditions. It was found to be viable longer when desiccated. The effect of various disinfectants was also tested. —J. E. Wilson.

Burnet, F. M., & Rountree, Phyllis M. (1935). **Psittacosis in the Developing Egg.**—*J. Path. Bact.* **40.** 471-481. 4 text figs., 6 figs. on 2 plates, 1 table. [5 refs.]

Using the technique previously described for vesicular stomatitis virus [Burnet & Galloway – this *Bull.* **4.** 726.] the Australian strains of psittacosis virus have been cultivated on the chorio-allantoic membrane of developing eggs. The lesions which were produced were less marked than those induced by other viruses (vesicular stomatitis, infectious laryngotracheitis, etc.), but a distinct oedematous thickening of the membrane with scattered white opaque foci was observed. The membrane lesions contained large amounts of virus from the second to the fourth day, a dilution of 10^{-4} killing mice by intracerebral inoculation (0·02 c.c.) and 10^{-5} by intraperitoneal injection (0·4 c.c.).

The histological appearances differed from any other type of virus infection in the egg, since the lesions were almost entirely confined to the chorio-allantoic membrane and underwent rapid resolution after the fourth day. Changes in the mesodermal and endodermal layers were relatively unimportant ; moreover, no infection of the embryo itself occurred. Levinthal-Coles-Lillie bodies were abundant in the cultures at all stages of infection : in addition, a cycle of development somewhat similar to that described by Bedson [this *Bull.* **4.** 471.] in the mouse was also detected in the egg cultures.—R. E. Glover.

I. Levinthal, W. (1935). **Recent Observations on Psittacosis.**—*Lancet.* **228.** 1207-1210. [1 ref.]

II. —. (1935). **Psittacosis.**—*Ibid.* 1226-1227. [8 refs.]

I. This article is prefaced by a general survey of the epidemiology and main lines of experimental investigation of the virus of psittacosis. It is pointed out that evidence from several sources [see this *Bull.* **4.** 736, and **5.** 352.] indicates that human beings can be infected by apparently healthy birds which are carriers of the virus.

A description is given of experiments on the propagation of the virus in tissue cultures. The author has grown several strains in a medium similar to that devised by Rivers [this *Bull.* **2.** 288.] for the cultivation of vaccinia and " louping ill." Multiplication occurs exclusively in the surviving tissue, preferably within epithelial or endothelial cells, although later virus bodies appear free in the liquid. The variations in the forms of the virus are ascribed to environmental factors and not to a developmental cycle as suggested by Bedson and Bland. The retention of the name originally suggested by Levinthal for the causal agent, viz. *Microbact. multiforme psittacosis*, is advocated.

Mice have also been successfully immunized with formolized virus and with

emulsions photodynamically inactivated by methylene blue. The treated mice were immune to ten million lethal doses of virus.

II. An annotation on the above in which special stress is laid on the danger arising from carrier birds and on the necessity for an early, correct diagnosis. The value of the inoculation of mice with sputum from suspected cases is noted. —R. E. Glover.

Armstrong, C., & Wooley, J. G. (1935). **Studies on the Origin of a newly discovered Virus which causes Lymphocytic Choriomeningitis in Experimental Animals.**—*Publ. Hlth Rep., Wash.* **50.** 537-541. 1 table. [3 refs.]

In a recent report [Armstrong, C., & Lillie, R. D. (1934). *Publ. Hlth Rep., Wash.* **49.** 1019.], a description was given of a virus, isolated by monkey passage from infective cerebral material of human origin in the course of an encephalitis epidemic, which induced a lymphocytic meningitis. Two further strains have now been obtained, one from human and one from monkey brains. These viruses are pathogenic for monkeys and mice by intracerebral inoculation, setting up a very typical lymphocytic infiltration.

Specific antibodies were found in the sera, not only of recovered monkeys, but also in a small proportion of apparently normal monkeys and human beings who had no history of an attack of encephalomyelitis. It is suggested that an immunity to this disease may develop in the absence of central nervous symptoms. —R. E. Glover.

Hyde, R. R. (1935). **An Interpretation of the Filterable Viruses.**—*Amer. J. Hyg.* **21.** 472-481. 1 fig. [14 refs.]

In a general review of the filtrable viruses, the author endeavours to formulate a suitable method of classification. He suggests four main divisions. Group I contains those conditions in which the causative agent induces well-defined inclusion bodies and passes ordinary filters (e.g. rabies, Borna disease, etc.). Group II comprises diseases in which cell inclusion bodies have been demonstrated, but the filtrability of the causal agent has not been definitely established (varicella, etc.). Group III is composed of conditions in which the filtrability of the inciting factor has been determined, but inclusion bodies have not been demonstrated with certainty (rinderpest, swine fever, etc.). In group IV are placed diseases of undetermined origin in which the activity of a virus is probable (measles, trachoma, etc.).

The relationship of viruses to filtrable forms of visible organisms is discussed. It is suggested that much confusion has arisen through a failure to recognize that, whilst true filtrable viruses are filter passers, not every disease-producing agent which passes a filter is a virus. On these grounds the author excludes the virus of contagious bovine pleuro-pneumonia from the group.—R. E. Glover.

Rous, P., McMaster, P. D., & Hudack, S. S. (1935). **The Fixation and Protection of Viruses by the Cells of Susceptible Animals.**—*J. exp. Med.* **61.** 657-688. 2 text figs., 3 figs. on 1 plate, 9 charts. [47 refs.]

A series of experiments were undertaken with the object of determining whether viruses become attached to cells or are actually intracellular and, further, to investigate the action of the cell in affording protection against virus infections. The two agents which were studied were vaccinia causing necrotizing lesions, and Shope's fibroma virus which induces rapidly proliferating, connective tissue tumours.

The cell emulsions were obtained from tissue cultures of rat embryos, individual cells being secured by liberation from the plasma by the aid of trypsin. These

suspensions, either in the living state or after the cells had been killed by ultra-violet light or by heat, were exposed to virus-containing fluids and were then submitted to the action of neutralizing sera. It was found that the viruses were fixed to both living and dead cells and were not removed by repeated washing. When infected living cells were exposed to immune sera the viruses were not affected, but in association with dead cells they were neutralized. Fixation to the cells took place with great rapidity.

The Shope virus was successfully maintained in tissue cultures where it was closely associated with the cells, the culture fluid being non-infective.

The authors suggest, as a result of these experiments, that :–

" The prompt fixation of viruses upon living cells, with protection of them afterwards, will go some distance to explain how viruses obtain a foothold in the host, and why serum treatment is so often unsatisfactory once infection is underway. Loss of protection when the virus-affected cells die in the period after antibodies have come into circulation may be the reason for recovery from virus diseases. Local vaccinial lesions evidently develop and progress by a multiplication of the virus in association with cells, which, however, are soon killed by it. The resulting exposure of the virus to principles seeping into the lesion from the blood can deter but little the progress of the disease in the days before effective antibodies come into circulation. But when this happens, one may suppose that the virus is neutralized wherever it deprives itself of the protection of cells by killing them . . . . .

" Conditions are somewhat different with the Shope fibroma. Shope reports that the growth continues to enlarge for some time after neutralizing antibodies for the virus have appeared in the blood. Possibly the cells affected by the virus ultimately degenerate and no longer protect the virus from serum antibodies of mounting potency."

—R. E. Glover.

Cowdry, E. V., Lucas, A. M., & Fox, H. (1935). **Distribution of Nuclear Inclusions in Wild Animals.**—*Amer. J. Path.* **11.** 237-252. 21 figs. on 1 plate, 1 table. [22 refs.]

This is a detailed survey of an examination of the kidneys and other organs of a large number of mammals and birds to determine the incidence of intranuclear inclusions. A search was made for the Type A and B of Cowdry (Type A – those caused by the viruses of herpes, yellow fever, Aujeszky's disease, etc. : Type B – those caused by the viruses of Borna disease, poliomyelitis etc.). The morphological differences between these two types are described, and the animals in which intranuclear inclusions were found are listed in a table. The results and applications of the study are discussed.—J. R. M. Innes.

I. Schlesinger, B., Signy, A. G., & Amies, C. R. (1935). **Aetiology of Acute Rheumatism. Experimental Evidence of a Virus as the Causal Agent.**—*Lancet.* **228.** 1145-1149. 4 figs. on 1 plate, 2 tables. [22 refs.]

II. —. (1935). **Aetiology of Acute Rheumatism.**—*Ibid.* 1162.

I. The authors bring forward evidence suggesting that acute rheumatism in human beings is caused by a filtrable virus. Cases of very acute infection which rapidly progressed to a fatal termination were chosen, and the pericardial fluid was removed with sterile precautions. This exudate, which in each case was free from ordinary bacterial contaminants, was submitted to fractional centrifugation at high speed and a deposit obtained which contained innumerable particles resembling elementary bodies.

Formolized suspensions of these granules were then added to sera from patients in varying stages of rheumatism. It was found that agglutination occurred only at certain stages of the disease, the highest titre being obtained with sera from patients in whom the process had been active for a long period. Control sera from healthy persons and from patients suffering from other complaints failed to agglutinate these particle suspensions.

It is suggested that the bodies found in the pericardial exudates represent the actual infective agent of acute rheumatism. It is further postulated that it may be enabled to exert its action through the preliminary activity of a streptococcal infection.

II. An editorial on the above.—R. E. Glover.

INVERTEBRATE VECTORS OF DISEASE.

Bhatia, H. L. (1935). **The Role of *Tabanus orientis* Wlk. and *Stomoxys calcitrans* Linn. in the Mechanical Transmission of Rinderpest.**—*Indian J. vet. Sci.* **5.** 2-22. 5 figs., 8 tables, 3 charts. [27 refs.]

This article records attempts to transmit rinderpest from ox to ox by the interrupted feeding of specimens of *T. orientis* and *S. calcitrans*, the interval between the feeds on the infected animals and the clean animals not exceeding five hours. Wild flies were collected, kept singly in glass tubes stoppered with cotton wool and containing moist blotting paper, and starved for about 24 hours before use for experiment. To induce feeding, areas of skin were shaved, the stomoxys being shaken on to the skin by tapping the glass tube, and the *T. orientis* placed on the skin after cutting one wing to prevent escape. Four bulls were used for experiments with each species of fly, and two of the eight animals developed a rinderpest infection. It is claimed that one of these animals was infected by the feeding of 36 *T. orientis*, and that the other contracted infection by contact with it. [The article is not entirely conclusive, as no information is given as to the precautions taken to prevent infection by the carriage of virus by other agencies than the flies, except that the clean animals were housed in sheds at a considerable distance from the shed in which the " controls " were kept. It is also admitted that the sheds were not totally fly-proof].—U. F. Richardson.

Pomerantzev, B. I. (1934). **Ticks in the Valley of Arax, Armenia.**—*Trud. Sov. Izuch. proizv. Sil. Ser. Zakavkaz.* Pt. 2. pp. 63-66. 1 fig. [In Russian: abst. from abst. in *Rev. appl. Ent.* **23.** 2].

Various species of *Hyalomma*, one of *Haemaphysalis* and one of *Rhipicephalus* were found on mountain grassland in south-west Armenia, and *Argas persicus* was common in fowl houses.—J. E.

Lototzkii, B. V., & Popov, V. V. (1934). **Ticks in the North-Eastern Region of Armenia.**—*Trud. Sov. Izuch. proizv. Sil. Ser. Zakavkaz.* Pt. 2. pp. 67-80. [In Russian: abst. from abst. in *Rev. appl. Ent.* **23.** 2-3].

Two species of *Rhipicephalus*, two of *Hyalomma* and one each of *Dermacentor* and *Ixodes* were found on domestic animals in the high mountain districts of north-eastern Armenia.—J. E.

DISEASES CAUSED BY METAZOAN PARASITES.

Manley, F. H. (1935). **A Note on Caprine Demodectic Mange.**—*Vet. Rec.* **15.** 118-120. 6 figs. [4 refs.]

The author states that it is often difficult to demonstrate *Demodex* from cases of caprine demodectic mange in Cyprus. The lesions of one case were examined by cultural methods; no organisms were isolated, but a goat inoculated with the caseous contents of the nodules developed pustules at the site of inoculation after

25 days, followed by death in four days. A *post-mortem* examination revealed acute broncho-pneumonia and suppurative foci in the liver. From these lesions an organism was isolated which was not identified but was believed to be a type of streptothrix. The organism was pathogenic for rabbits, and a goat inoculated subcutaneously developed caseous nodules from which the organism was recovered. The author considers that this organism may be associated with *Demodex* in the production of a nodular skin disease of goats.—F. Blakemore.

Thorshaug, K. (1935). Griseskabb. [**Mange in Swine**].—*Norsk VetTidsskr.* **47.** 72-79. [15 refs.]

This article is a communication from the State Veterinary Clinic, Oslo, where the author has carried out some practical work on the problem of diagnosis and treatment of mange in swine. The author first gives a survey of the occurrence of the disease in Norway and then quotes some more recent investigations on the life-history of the mites. The litter becomes infected from the sow. She may look quite healthy, but yet carry latent parasites, especially in the skin of the lower parts of the limbs. The efficacy of some parasiticide dressings has been tried and some practical advice on their use is given. As a rule, two applications are necessary before a complete cure is obtained. The attention of veterinary practitioners is directed to the greater possibility of the spread of the disease owing to the increased trade with young pigs nowadays and, finally, the author mentions the compulsory notification of the disease in Norway.—G. N. (Farsund).

Stefanski, W., & Obitz, K. (1935). W sprawie czestosci wystepowania i rozmieszczenia gza bydlecego (*Hypoderma* sp.) na terytorjum rzplitej polskiej. [**Incidence of Cattle Warble Flies in Poland**].—*Wiad. weteryn.* **14.** 89-97.

Stefanski, W., & Obitz, K. (1935). O rozmieszczeniu " malego gza bydlecego " (*Hypoderma lineatum* de Villers) w polsce. [*H. lineatum* **in Poland**].—*Ibid.* 98-105. 1 fig., 1 table.

Stefanski, W., & Obitz, K. (1935). Metody zwalczenia gza bydlecego (Hypoderma sp.) sprawozdanie za rok 1934. [**Control of Ox Warbles in Poland in 1934**].—*Ibid.* 106-123. [Abst. from French summaries].

The incidence of ox warble flies in Poland was enquired into by means of a circular letter, sent by the chief veterinary officer of the Ministry of Agriculture, to all district veterinarians.

The results are shown on a map. Infestation of cattle varies very much in different parts – between 1 and 10 per cent. of the cattle population in 92 districts, 10 per cent. in 50 districts, 25 to 40 per cent. in 27 districts and 40 to 100 per cent. in 30 districts : the western part of the country was less heavily affected.

Over 3,000 hypoderma larvae were sent in for examination and about one quarter of all proved to be *H. lineatum*, which species had a very restricted habitat around the frontier of Poland [presumably the majority occurring throughout the country were *H. bovis*].

The authors report good results with derris.—J. E.

McIntosh, C. W., & Mackie, C. (1934). **Cattle Warbles.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* p. 53.

For the killing of mature warble fly larvae in the backs of cattle :–

" . . . it was decided to test the value of powdered derris root extracted by and suspended in carbon-tetrachloride in the proportion of 20 grams to 100 c.c., and a solution of a disinfectant with a high phenol co-efficient in a strength of 10 per cent. The applications were

made with a small oil-can or syringe directly into the cyst through the small opening made by the grub. One side of the animal was treated with the derris-carbon-tetrachloride mixture and the other side with the disinfectant solution.

" Treatments were applied on May 3-4, June 14, 15, 23, and July 12. The cattle were examined and warbles extracted at intervals after treatment. While the majority were dead, neither preparation was highly efficient, which would indicate that if eradication is to be complete, treatment must be started early (at the time when larvae first reach the back), and continued during the entire period of their presence there."

—J. E.

I. Schwerdt. (1935). Die Bekämpfung der Dasselfliege. [**Report on the Campaign against Ox Warble Flies in Germany in 1934**].—*Berl. tierärztl. Wschr.* **51.** 266-268.

II. Lührs, E. (1935). Die Dasselbekämpfung in Oldenburg im Frühjahr 1934. [**Campaign against Warble Flies in Oldenburg Early in 1934**].—*Dtsch. tierärztl. Wschr.* **43.** 129-134. 2 tables.

I. A summary of the results of the warble fly campaign in Germany, of which II is one of the individual provincial reports. [See also reports for Schleswig and Prussia, this *Bull.* **5.** 501. The law of the German Reich for the campaign against warble flies was passed in December, 1933].

A meeting of the principal organizers was held at Berlin in December, 1934, to report on progress and to arrange for the work in 1935. Spann, Bavaria, advocated the crochet hook mechanical method of removing warbles and suggested that thick-skinned mountain cattle were less easily treated with derris wash than thin-skinned plains cattle [no statistical information given]. Other reports favoured derris. A few cases were reported of deaths after treatment, irrespective of the method used, and ascribed to anaphylaxis. Compensation is paid in such cases.

A commission of nine persons, mostly veterinary officers in charge of provincial operations, was appointed and recommendations under 12 headings were passed. These relate to the local organization of each district. Men to carry out the actual work (" Abdassler "), by derris wash or hook, are chosen by the local agricultural organizer (" Ortsbauernführer "), are technically instructed by the chief veterinary official (" Oberamtstierarzt ") and thereafter work under the agricultural organizer's direction and are paid by him. All cattle must be treated before going to pasture in May and they must be re-inspected and treated if necessary during the last half of June. Compensation is paid to the farmer at a scale up to 80 per cent. of the full value for deaths following treatment.

II. A detailed account including copies of the text of the warble fly law and of the order issued by the Agricultural Organizer of Oldenburg.

In 1934, 208,000 cattle were treated by 530 men trained as above ("Abdassler"), each treating an average of 87 beasts per day for four and a half days. Deaths following treatment, not all proved to result from it, included 36 (0·017 per cent.) from anaphylaxis (diagnosed by the finding of oedema of the glottis and haemorrhage under the epicardium and endocardium and in the musculature of the back). Sixty-three (0·019 per cent.) cases of abortion occurred, mostly in herds free from *Br. abortus* infection : many of these showed urticaria and general functional disturbance before aborting and 94 further cases of urticaria were recorded from replies to a questionnaire sent to veterinary practitioners. A wash of unstated composition, " panderran ", was used throughout.

In order to find out whether affected animals might be likely to be harmed by treatment, allergic tests (ophthalmic, cutaneous and intradermal) with warble extract and complement-fixation blood tests were carried out, but the results did not agree with the severity of parasitism and gave no indication of the potential risk of subsequent treatment as checked when all the animals were treated with " derrilavol ".

Lührs believes that anaphylactic symptoms are caused by the sudden death of a warble or warbles following their crushing *in situ*, rather than by their gradual death following the chemical wash. He also attempted to immunize calves against warble fly parasitism by inoculating them with 20 c.c. of warble extract subcutaneously, but in the following year the test calves became infested to the same extent as uninoculated controls.—J. E.

DU TOIT, R., & CLARK, R. (1935). **The Sheep Nasal Fly. A Method of Treatment for Sheep infected with Larvae of** *Oestrus Ovis*.—*J. S. Afr. vet. med. Ass.* **6.** 25-32. 2 figs.

Owing to the increasing incidence of infection of the sinuses of the head in sheep with the larvae of *Oestrus ovis*, methods of treating animals for these parasites had to be devised. It was found that carbon tetrachloride was very effective and tetrachlorethylene equally so. A method of injecting a mixture of equal parts of carbon tetrachloride and liquid paraffin into the sinuses, using a special trocar, was devised, the point of inoculation varying with the development of the horns. Alarming symptoms of intoxication developed immediately after inoculation, but quickly passed off. The larvae were killed and apparently in most cases ejected by the sheep. The final portion of the paper is devoted to a description of field experience with the treatment.—E. M. ROBINSON.

—. (1935). **Myiasis in Domestic Animals due to** *Cordylobia anthropophaga*.—*J. S. Afr. vet. med. Ass.* **6.** 56-57. [Reprinted from *Dept. News Lett.* No. 22. to G.V.O.'s].

This form of myiasis is not uncommon in South Africa ; the dog is the chief sufferer, but rabbits may be badly affected. The maggots occur chiefly in the skin of the paws or the under surface of the body. A description of the maggot is given. The life-history of the fly is not accurately known, but it is believed to lay its eggs in the ground in the resting places of animals. The treatment of the condition is described.—E. M. ROBINSON.

BUGGE, G. (1935). Die Wanderungen der Leberegel in den Organen der Schlachttiere. [**Wanderings of the Liver Fluke in the Organs of the Host**].—*Berl. tierärztl. Wschr.* **51.** 65-68. 4 figs. [19 refs.]

In the early days it was considered probable that the young flukes made their way to the liver *via* the bile duct ; later it was held that they penetrated the wall of the intestine, traversed the abdominal cavity and pierced the capsule of the liver but, as was shown by the author in a previous work, it is now known that they generally make their way to the liver *via* the same route as is travelled by nematode and cestode larvae, i.e. the portal circulation.

Observations during meat inspection have led the author to conclude that the wanderings of flukes into other organs usually come about through the young flukes, while boring through the parenchyma of the liver in search of the bile ducts, entering a vein and being carried to the heart, from where they are transported to the lungs. They also frequently enter the lymphatics in the wall of the intestine instead of the small veins of the portal system, and travel along the lymphatic vessels. The presence of flukes in lymph glands is accounted for in this way.—E. L. TAYLOR.

CATTANEO, F. (1935). A proposito della cisticercosi bovina. E proprio l'esofago la sede di predilezione del Cisticercus bovis ? [*Cysticercus bovis* **in the Oesophagus of Cattle**].—*Clin. vet., Milano.* **58.** 53-58. [11 refs.]

This is a discussion concerning the length of time *C. bovis* remains infective

for man in chilled beef. Some consider that this period may exceed 21 days. The author records that the cysts have often been found in the oesophageal muscles and suggests that meat should be kept at –8°C. for a few days in order to ensure the destruction of any cysts which may have been overlooked. [See also this *Bull.* **2.** 452].—J. A. Nicholson.

Joyeux, C., & Baer, J. G. (1934). Sur quelques cestodes de France. [**Some Cestodes from France**].—*Arch. Mus. Hist. nat. Paris.* **11.** 157-170. 4 figs. [27 refs.]

The following notes are of some veterinary interest. Material examined from the fox suggests that Dujardin's specimen described as *Taenia crassiceps* Rud., 1810, was actually a specimen of *T. serialis.*

A variety of *T. tenuicollis* which retains its hooks in the adult state has been described as occurring in some of the Mustilidae. Differences apart from the hooks appear to be invalid and if it be shown that some specimens of *T. tenuicollis* retain their hooks, the variety cannot stand.

T. intermedia Rud., 1809, is described from the marten.

Intermediate stages of *Amoebotaenia sphenoides* of the fowl were found in the earthworm *Allolobophora chlorotica.* This is the first time its occurrence has been observed in that intermediate host, and is the first record of its occurrence in France.

Dujardin's species *T. exilis* is probably the same as *Hymenolepis carioca*, but the description is too scanty to warrant any change in the name.—E. L. Taylor.

Skladnik, J. (1935). Trichoneminae u koni w polsce. [**Trichoneminae of the Horse in Poland**].—*Wiad. weteryn.* **14.** 137-183. 25 figs., 1 table. [20 refs.] [Abst. from French summary].

In the examination of 25 horses, the author came across the following 24 species of Trichoneminae :– *Trichonema cornatum*, *T. labiatum*, *T. labratum*, *T. catinatum*, *T. goldi*, *T. pateratum*, *T. nassatum*, *T. radiatum*, *T. insigne*, *T. elongatum*, *T. leptostomum*, *T. asymetricum*, *T. calicatum*, *T. minutum*, *T. longibursatum*, *T. hybridum*, *T. poculatum*, *T. bicornatum*, *T. mettami*, *T. ultrajectinum*, *T. euproctum*, *Poteriostomum rátzii*, *P. imparidentatum* and *Gyalocephalus capitatus.* Each species is described with the aid of original drawings. Careful examination of specimens cleared in lactic acid revealed the presence of small teeth, which have not previously been described, in the oesophageal funnel of several species. Comparisons of individuals have led the author to conclude that *T. barbatum* Smith and Notosoediro, 1923 is identical with *T. calicatum* Looss, 1900, and that *T. bidentatum* Ihle, 1925 is identical with *T. asymetricum* Theiler, 1923.—E. L. T.

Yugawa, T. (1934). **Trichina found in Dogs in South Manchuria.**—*J. orient. Med.* **21.** p. 88 of English absts. [Copied *verbatim* from *Helminth. Abstr.* **3.** 106-107. Signed J. N. O.].

Yugawa has detected trichinosis in 14 out of 179 (7·95 per cent.) pariah dogs examined in Liaoyang and Mukden, South Manchuria. In the absence of complete adults the forms found were presumed identical with *Trichinella spiralis.* Infection experiments with dogs, rabbits and albino rats were successful. Details of precipitation and skin reactions with extract of the parasites, as diagnostic methods for trichinosis, are promised.

IMMUNITY.

Reichel, J., & Clark, L. T. (1934). **The Manufacture of the Purified Protein Derivative of Tuberculin.**—*Amer. Rev. Tuberc.* **30.** 721-725. [6 refs.]

In this article the authors give details of the preparation of tablets containing standard amounts of precipitated tuberculin. [The value of these tablets in tuberculin testing the human subject has been described in a series of articles which has already been abstracted – this *Bull.* **5.** 634].—R. E. Glover.

Weinzirl, J., & Weiser, R. S. (1934). **The Desensitization of Tuberculous Guinea Pigs by Means of Natural Tuberculin Prepared from Fractured Bacilli.**—*Amer. Rev. Tuberc.* **29.** 660-667. 4 tables. [8 refs.]

A tuberculin has been prepared by submitting cultures of tubercle bacilli to repeated treatment with liquid air. After 35 consecutive freezings, the emulsion was centrifuged and the supernatant fluid used as an antigen. It is referred to as " natural tuberculin " (" N.T.")

It was found that extremely small doses would kill allergic guinea pigs but, when sublethal doses were used, little or no shock was observed. Accordingly, a series of guinea pigs were injected with tubercle bacilli of varying virulence. As soon as skin sensitivity had developed they were desensitized with repeated weekly doses of " N.T." At the end of this period, the animals were able to withstand up to 60 M.L.D. of " N.T." or of Seibert's synthetic medium tuberculin. The cell débris failed to show any desensitizing powers for guinea pigs.—R. E. Glover.

Kallós, P., & Nathan, E. (1934). Ueber die Darstellung und biologischen Eigenschaften des wirksamen Prinzips des Tuberkulins (β-Tuberkulin). I. Mitteilung. II. Mitteilung. Sensibilisierungsversuche mit β-Tuberculin. III. Mitteilung. Ueber Allergie und Immunitätsverhältnisse bei Tuberkulose. [**The Preparation and Biological Properties of the Active Principles of the Tuberculins (β-Tuberculin). Parts I and II. Sensitization Tests with β-Tuberculin. III. Allergy and Immunity in Tuberculosis**].—*Acta med. scand.* **83.** 130-164, 165-168 and 169-196. 7 figs. [140 refs.] [In German].

Kallós, P., & Zoboli, C. (1934). Ueber die biologischen Eigenschaften des wirksamen Prinzips des Tuberkulins. (β-Tuberkulin). IV. Mitteilung. Weitere Sensibilisierungsversuche mit β-Tuberkulin. [**Preparation and Biological Properties of the Active Principles of the Tuberculins (β-Tuberculin). IV. Further Sensitization Tests with β-Tuberculin**].—*Ibid.* 197-211. 7 figs. [17 refs.] [In German].

[It is to be noted that although the subtitles are numbered serially they have not a common main title. Parts I, II and III are given above].

The biological action of the protein-free tuberculin extract (β-tuberculin of Kallós and Hoffmann) is described, which is prepared from a ten-week-old broth culture of *Mycobact. tuberculosis*. In addition to containing no protein the product is also free from glycerin, carbolic acid, salts, etc. Intradermal injections of β-tuberculin into tubercle-free guinea pigs was not followed by any reaction and no sensitization took place, since a second injection two weeks later produced no allergic response. In tuberculous guinea pigs the β-tuberculin was about 100 times more sensitive than " old tuberculin ". When 250 human beings were tested by simultaneous injections of β-tuberculin and " old tuberculin ", the results supported those obtained by guinea pig tests.

As the result of the examination of the anaphylactic effect of β-tuberculin, it is concluded that the tuberculin reaction is dependent upon fixed antibodies.

Although no real sensitization was produced by an inoculation of β-tuberculin, the reinoculation into the site of an intradermal reaction 24 hours later produced a typical Shwartzman phenomenon, i.e. haemorrhagic reaction. Certain immuno-

biological properties of the human skin, when infected with dermal tuberculosis, are noted.

In further attempts to produce sensitization of guinea pigs with β-tuberculin, this product was injected in conjunction with fresh pig serum. The result, however, was negative. Examining the possibility that the mixture was too alkaline, the experiment was repeated using horse in place of pig serum. This mixture produced an antigen specific for unstriated guinea pig muscle.—E. J. PULLINGER.

RADTKE, G. (1935). Beitrag zur Tuberkulinkehllappenprobe, insbesondere zur Frage der Sensibilisierung durch Wiederholung derselben. [**The Double Tuberculin Wattle Test**].—*Berl. tierärztl. Wschr.* **51.** 81-85. 1 table. [43 refs.]

Seventeen out of 29 unvaccinated, tubercle-free fowls gave typical positive reactions after they had been tuberculin tested in the wattle on several occasions. The earliest stage at which such sensitization occurred was after weekly repetitions of the double intradermal test for 49 days. Sensitization may endure for a year or longer. The avian tuberculin used for these tests contained a relatively large number of tubercle bacilli, but a similar preparation after careful filtration produced sensitization in 50 per cent. of instances, so that sensitizing property belongs to an extract of tubercle bacilli and not to whole organisms. A general, as well as a local, reaction follows testing of the wattle ; if sections are made of the wattle or liver of a sensitized bird, foci of epitheloid cells may be seen.—E. J. PULLINGER.

SCHULTZ, C. (1935). Verwertung der Untersuchungsergebnisse des Milchserums auf Tuberkulose-Antikörper für das Tuberkulosebekämpfungsverfahren. [**Value of Complement-Fixation Tests with Whey in the Detection of Bovine Tuberculosis**].—*Dtsch. tierärztl. Wschr.* **43.** 113-114. [12 refs.]

Schultz concludes from an examination of quarter samples from 7,721 cows in 131 herds, whose mixed milk produced tuberculosis in guinea pigs, that the use of the complement-fixation test made with whey is a useful help in the detection of udder tuberculosis, but that it cannot replace clinical examination, because it was negative in many cases (15 per cent.) where lesions were detectable, and can certainly not replace guinea pig inoculation. A great drawback to the method was the high percentage of cases (80 per cent.) in which a positive serological result was not correlated with a positive result in the guinea pig.—A. W. STABLEFORTH

SARNOWIEC, W. (1935). L'agglutination paradoxale dans la brucellose bovine. Influence de l'infection tuberculeuse associée. [**The Zone Phenomenon in the Agglutination Test for Bovine Contagious Abortion. The Influence of Associated Tuberculosis**].—*C. R. Soc. Biol. Paris.* **118.** 1392-1394. [1 ref.]

Sera which were found to exhibit the zone phenomenon in the agglutination test for *Brucella abortus* infection were subjected to the complement-fixation test for tuberculosis. Evidence of this disease was detected in 52 per cent. of the samples and the author concludes that the zone phenomenon is usually due to a dual infection with *Mycobact. tuberculosis* and *Br. abortus*.—F. BLAKEMORE.

SARNOWIEC, W. (1935). Phénomène de zone obtenu avec le sérum de cobayes tuberculeux traités par des filtrats de cultures de *Bacillus abortus*. [**Zone Phenomenon Produced with the Serum of Tuberculous Guinea Pigs Treated with Culture Filtrates of** *Brucella abortus*].—*C. R. Soc. Biol. Paris.* **119.** 167-169. [1 ref.]

Tuberculous guinea pigs, when inoculated with filtrates of *Br. abortus*,

developed agglutinins demonstrable only in high serum dilutions of 1 : 300 or more. In lower dilutions no agglutination occurred.—E. J. Pullinger.

Karsten, & Bischoff. (1935). Die mit dem Milchserum angestellte Komplementbindungsmethode zur Erkennung Banginfizierter und Bangbakterien mit der Milch ausscheidender Kühe. [**Complement-Fixation Tests with Whey for the Diagnosis of *Brucella abortus* Infection of the Udder in Cows**].—*Dtsch. tierärztl. Wschr.* **43.** 70-71. 2 tables. [3 refs.]

The authors first give details of 240 cows to emphasize the fact that, for the detection of infected cows, serological tests with whey, although both agglutination and complement-fixation tests be carried out, are inferior to agglutination tests alone made with blood serum. These tests are on the other hand of great value in pointing out those udders which are actually excreting *Br. abortus*, an agglutination titre of 1 : 40 or complement-fixation with 0·05 c.c. being an indication that *Br. abortus* is probably present. The combination of the two methods when testing bulk milk, results in the detection of a definitely larger number of infected herds than either alone.—A. W. Stableforth.

Konno, T., & Tanikawa, T. (1934). Ueber Präzipitation sowie Komplementbindung bei Milzbrandseren und den Parallelismus zwischen beiden Reaktionen. [**Precipitation and Complement-Fixation with Anthrax Sera ; Parallelisms between the Two Reactions**].—*9th Rep. Govt. Inst. vet. Res. Fusan, Japan.* Pt. 2. pp. 29-40. 9 tables. [7 refs.] [In German : Japanese summary Pt. 1. pp. 133-134].

The production of precipitation and complement-fixation antibodies in the sera of horses and rabbits inoculated with anthrax has been examined and compared. Three types of antigen were prepared for immunization, two from spore vaccines and the third from a virulent culture ; all were formalinized by a modification of Ivanoff's method. In both rabbits and horses precipitin formation was obtained, and there appeared to be no appreciable difference in the stimulating power of the three antigens. In carrying out the precipitin tests extracts of the same three antigens were used, and in this case the more virulent the source of the extract the better the precipitation. Fixation of the complement was also found to occur in all the sera, but the virulence of the antigen used in the test had no appreciable influence. In general, horse serum gave better precipitin content, while rabbit serum gave slightly better complement-fixation results. The complement-fixing antibody was usually found earlier in the course of immunization than the precipitin.—Norman Hole.

Kenda, I. (1934). Upotrebljivost liquora pericardii za serolosku diagnostiku malleusa putem vezanja komplemenata. [**The Use of Pericardial Fluid for Serological Tests for Glanders (Complement-Fixation Test)**].—*Jugoslov. vet. Glasn.* **14.** 652-656. 5 tables. [5 refs.] [Abst. from German summary].

The use of pericardial fluid (obtained *post mortem*) for the complement-fixation test for glanders gave inferior results to those obtainable with blood serum taken from the same animals during life.—J. E.

Mitchell, C. A., Humphreys, F. A., & Walker, R. V. L. (1934). **The Serological Diagnosis of Haemorrhagic Septicaemia.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 51-52.

Much work has been done on the subject with the following results :—

" 1. The agglutination test was found unsatisfactory for the diagnosis of haemorrhagic septicaemia in cattle or swine.

" 2. The use of the complement fixation test as ordinarily employed is precluded in the case of swine due to the presence in the serum of these animals of natural haemolysins for sheep's red blood corpuscles.

" 3. A satisfactory method for the production of an antigen to be used in the complement fixation test for the diagnosis of haemorrhagic septicaemia of cattle was found. This consists in growing a suitable strain of *Pasteurella bipolaris-septicus* in broth, precipitating the organisms by centrifugalization, removing the supernatant fluid and re-suspending the organisms in normal saline.

" 4. Complement fixing properties appear in the blood of cattle 6-7 days following infection.

" 5. Blood sera taken from animals affected with anthrax, blackleg or infectious abortion do not fix complement in the presence of the *P. bipolaris-septicus antigen.*

" 6. Animals recovering from haemorrhagic septicaemia retain the complement fixing properties in their blood for from 2-4 months.

" 7. In infected herds, complement fixing properties appear in the blood of a few animals which show no clinical symptoms or only a mild form of the disease.

" 8. Apparently the animals infected first and last in an outbreak are the ones presenting mild or no clinical symptoms, and in between these the fatal acute cases occur.

" 9. The complement fixation test is of value in diagnosing herd infection but it is worthless for the diagnosis of the acute case since animals die before complement fixing properties are formed."

—J. E.

Nowara, H. (1935). Badania doswiadczalne nad rozpoznawaniem metoda serologiczna pierwotnych (za zycia) i nastepowych (po uboju) zakazen miesa paleczkami paratyfusowemi. [**Serological Diagnosis of Paratyphoid Infection in Cattle,** *ante* **and** *post mortem*].—*Przegl. wet.* **48.** 73-98. 12 tables, 20 graphs. [7 refs.]

In order to show whether meat is infected *ante* or *post mortem* with paratyphoid bacteria, the author carried out a number of agglutination and precipitation tests with serum, flesh, and spleen extract of rabbits previously inoculated with *Salmonella typhi-murium*, *S. enteritidis*, *S. cholerae-suis* and *S. paratyphi* B. If the flesh showed specific bacteria as well as specific agglutinins, it must have been obtained from an animal infected during life. Specific agglutinins were not found in the flesh extract of rabbits infected *post mortem* by paratyphoid bacteria. Precipitation tests do not always give definite results.—K. Szczudlowski (Lwów).

Konno, T., & Zaizen, K. (1934). Ueber Komplementbindungsversuch bei den Seren pulloruminfizierter Hühner, im Zusammenhang mit der Präzipitation. [**Complement-Fixation with the Sera of Fowls infected with** *Salmonella pullorum*, **and the Relation to Precipitation**].—*9th Rep. Govt Inst. vet. Res. Fusan, Japan.* Pt. 2. pp. 41-46. 3 tables. [2 refs.] [In German : Japanese summary Pt. 1. p. 134].

Bushnell and Hudson have reported complement-fixation tests, and Konno and Goto precipitation tests with *S. pullorum* positive sera. This article reports the results obtained from both methods, with the sera of 79 fowls. Forty-three of these were carriers, of which 81 per cent. (35 sera) showed a well-marked fixation of the complement, and the remainder gave a weak reaction. The normal sera showed no or very little fixation. All sera showing well-marked fixation also gave a good precipitin reaction when tested, and there is possibly some connection between the two.—Norman Hole.

Lange, & Roger. (1935). Application d'une nouvelle méthode de diagnostic de peste porcine (méthode Sarnowiec). [**Sarnowiec's Method for the Diagnosis of Swine Fever**].—*Rec. Méd. vét.* **111.** 21-29. 5 tables. [1 ref.]

The authors, collaborating with Sarnowiec, carried out tests of this method

of diagnosis for swine fever [see this *Bull.* **4.** 728.] upon a healthy group of pigs, three groups in various stages of the disease and one group under treatment, and describe the reactions in a tabulated form. Single negative reactions were sometimes incorrect, but a test of a group of six or more pigs was found reliable.

The diagnostic reaction is a local skin one ; there is also involvement of the nearest lymphatic gland and there may be cording of the lymphatics between these two points. These reactions may vary in degree, and diagnosis must be based on the collective effect.

No reaction was obtained with the excipient (castor oil) of the antigen when tested simultaneously with the antigen.—C. V. Watkins.

Velu, H., & Faure, L. (1934). Essai de diagnostic de l'anémie infectieuse du cheval par la méthode de W. Sarnowiec. [**Diagnosis of Infectious Anaemia in the Horse by Sarnowiec's Method**].—*C. R. Soc. Biol. Paris.* **115.** 713-714. [1 ref.]

The authors report a trial of the Sarnowiec method for the diagnosis of diseases due to ultra-microscopic viruses as applied to equine infectious anaemia. The single experiment made was carried out at the veterinary research laboratory in Morocco and involved the use of four affected animals and eight controls. No reaction was registered and the authors conclude that the method fails in this disease. [Details of the Sarnowiec technique were given in this *Bull.* **4.** 346]. —C. Davenport.

Panisset, L., & Pflieger, C. (1935). Contribution au diagnostic de l'anémie infectieuse du cheval. II. Emploi de la tuberculine. [**Diagnosis of Equine Infectious Anaemia. II. By the Use of Tuberculin**].—*Bull. Acad. vét. Fr.* **8.** 88-93. 9 tables. [1 ref.] [For abst. of previous article of this series, see this *Bull.* **5.** 418].

In this paper the authors report a further investigation of the value of tuberculin injections in the diagnosis of equine infectious anaemia. Following up their previous study of the subject, they carried out an intradermal tuberculin test on 59 healthy horses with a view to ascertaining whether negative results are consistently shown by such animals. No reactions were registered. They then proceeded to test the reagent by the subcutaneous route on a number of horses known to be suffering from equine infectious anaemia in a chronic form. A detailed report on nine cases is given. The results obtained could not be considered of any diagnostic value.—C. Davenport.

Kritschewski, I. L., & Demidowa, L. W. (1934). Ueber eine noch unbekannte Funktion des retikuloendothelialen Systems. XXII. Ueber die Bedeutung des retikuloendothelialen Systems in der Therapie der Malaria. [**The Significance of the Reticulo-Endothelial System in the Treatment of Malaria**].—*Z. ImmunForsch.* **84.** 14-21. 1 table, 2 charts. [3 refs.] [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 410. Signed E. D. W. Greig].

An investigation to determine the effect on the therapeutic activity of antimalarial drugs of blocking the reticuloendothelial system.

The drugs studied by the authors were quinine, plasmoquine, derivatives of acridine and acrichin No. 8. For the tests they employed birds infected experimentally with *Plasmodium praecox*. It was essential to determine very accurately the limit of the therapeutic dose of each drug for the birds. In one series of experiments the RES was blocked with trypan blue, in the other series the RES was intact. As a result of the investigation the authors reach the conclusion that

the therapeutic activity of antimalarial drugs (quinine, plasmoquine, derivatives of acridine and acrichin No. 8) is greatly lowered by blocking the RES with trypan blue.

Ando, K., Sudo, S., Ochi, Y., & Kasuga, T. (1934). **On The Mutual Prevention of Infection by Immunization with Live Organisms of Paratyphoid B, Br. abortus, Hog-Cholera** [*Salmonella cholerae-suis*], **and Rat Typhoid Bacilli.**—Abst. from abst. in *Kitasato Arch.* **11.** No. 4. p. 7 of English absts.

In 1931, one of the authors, Sudo, found that mice immunized with living *S. paratyphi* B did not die from infection with *S. typhi-murium*. Later Ochi, Kasuga and Ando observed that mice immunized with living *S. paratyphi* B, *Br. abortus*, *S. cholerae-suis* and *S. typhi-murium* B and their variations did not die from hog cholera B and the original type of *S. typhi-murium* B.

Following up these facts, the authors further studied the agglutination of the infecting organisms by the immune sera. The following conclusions were obtained :– (1) mice, which had been immunized with living organisms of the paratyphoid B group and its variations, resisted infection with organisms of this group and the original type of the variations. The resistance is in proportion to the virulence of the immunizing organisms ; (2) comparative studies of agglutination reactions of the immunizing and the infecting organisms and the rates of survival of the test animals show that the common thermostable antigen as proposed by Weil, Bruce-White, and Topley, could not be taken as the responsible antigen for the resistance of the animals.

Hartley, P., & White, P. B. (1934). **A Proposed International Standard for Gas Gangrene Antitoxin (Vibrion septique).**—*Quart. Bull. Hlth Org. L. o. N. Special Number. Biological Standardisation. Extract A.* pp. 29. 39 tables.

The National Institute for Medical Research, London, at the request of the Permanent Commission on Biological Standardization, undertook the work of organizing and of preparing the reagents necessary for the enquiry. Several experts in different countries were invited to test two samples of antitoxin of known potency and one of unknown potency, and their results were compared. The mouse intravenous and the guinea pig intracutaneous methods were employed.

The results obtained by the various workers are given in detail, and show close agreement.

"It is recommended that the Permanent Commission on Biological Standardisation should accept the dry stable preparation of gas gangrene antitoxin (*vibrion septique*), prepared at the National Institute for Medical Research, London, from material supplied by Dr. Weinberg of the Pasteur Institute, Paris, as the international standard of this antitoxin ; and that the Commission should define a unit, in terms of this standard preparation, for adoption for international use."

—A. Brownlee.

Ramon, G., & Richou, R. (1935). Essai sur l'immunité antitoxique. (Deuxième mémoire). De l'action toxique et immunisante de diverses toxines (abrine, toxine diphtérique, toxine staphylococcique) instillées dans le sac conjonctival chez le lapin. Nature et mécanisme de l'immunité ainsi produite. Immunité " locale " ou " générale " ? [**Antitoxic Immunity. Part II. The Toxic and Immunizing Action of Various Toxins injected into the Conjunctival Sac of the Rabbit. " Local " or " General " Nature of the Immunity thus Produced**].—*Ann. Inst. Pasteur.* **54.** 518-555. 11 tables. [31 refs.]

Using three different antigens, the vegetable toxin abrine, diphtheria toxin and staphylococcus filtrate, the authors have demonstrated that the progressive resistance acquired following the repeated instillation of each of these toxins into the conjunctival sac of rabbits is not a result of local immunity but a result of general immunity and antitoxin production.

In the case of abrine, the authors instilled repeated small doses into one eye and showed that while immunity developed in that eye it could also be demonstrated in the untreated eye, this resistance being established after and not before anti-abrine was present in the circulation. They also showed that the local inflammatory changes influence only the rapidity of anti-abrine production and not the nature of the immunity.

The use of diphtheria toxin led to similar results. It is also shown that, if instead of the irritant toxin, a modified toxin (anatoxin) is used, immunity does not result owing to the absence of conjunctivitis. If, however, an irritant such as ox-bile is added to the diphtheria anatoxin, sufficient local reaction is produced to admit absorption of the antigen into the circulation leading to antitoxin production. Immunity produced either by instillation of toxin or anatoxin plus irritant is appreciably the same as that produced by subcutaneous injections of antigen. Rabbits passively immunized by serum are also refractory to the instillation of toxin into the conjunctival sac, but with the disappearance of antitoxin from the circulation, the eye regains its sensitivity.

Working with staphylococcus toxin the authors were able to confirm all their findings with abrine and diphtheria toxin. They also state that nothing arose from their investigations to support BESREDKA's conception of " antivirus " and " local immunity ".—GWILYM O. DAVIES.

WEINBERG, M., & DAVESNE, J. (1935). Titre antitoxique et pouvoir anti-infectieux des sérums thérapeutiques. [**Antitoxic Titre and Immunizing Power of Antisera**].—*C. R. Acad. Sci. Paris.* **200.** 1074-1075.

Weinberg has previously found that an antiserum for gas gangrene which is both antitoxic and antibacterial is much more effective and rapid in action than one which is merely antitoxic.

The authors have now carried out experiments with 11 anti-*Clostridium septique* sera and one anti-*Cl. chauvoei* serum, and find that certain of the former contained a considerable fraction of *Cl. chauvoei* antitoxin, but gave no protection against *Cl. chauvoei*. Three *Cl. septique* sera with an anti-haemolytic titre of 20 units gave slight protection against *Cl. chauvoei*, but only sera containing 50 anti-haemolytic units were found capable of distinct neutralization of cultures of these bacteria. They now conclude that therapeutic sera of haemolytic bacteria are best when they contain antibodies for all the homologous bacterial antigens, i.e., they should contain antibodies against the non-haemolytic as well as the haemolytic toxins produced (this rule does not apply to those bacteria producing a non-haemolytic toxin of rapid action such as *Cl. tetani* and *Cl. botulinum*).—C. V. W.

TOPLEY, W. W. C., WILSON, J., & DUNCAN, J. T. (1935). **The Mode of Formation of Aggregates in Bacterial Agglutination.**—*Brit. J. exp. Path.* **16.** 116-120. 1 plate. [1 ref.]

In order to study the mode of formation of the aggregates in bacterial agglutination, the authors have taken two bacteria A and B, showing no antigenic relationship and with sufficient morphological difference to enable them to be distinguished from each other in fairly large aggregates. They have mixed equal numbers of bacteria suspended in equal volumes of saline and added the two corresponding

antisera a and b so diluted that agglutination of A and B occur over approximately the same time-interval. Drops were withdrawn at varying intervals, mixed with a drop of stain and examined at once under a one-twelfth objective. In certain experiments the organisms were stained in bulk beforehand. The combinations used contained pneumococcus Type XXXI and either *Salmonella typhi* (formerly *Bact. typhosum*) (O), *Bact. stanley* (H), *S. enteritidis* (O) plus (H), *Bact. flexneri* or pneumococci Type I.

Photomicrographs are given showing that the clumps formed consist of one type of organism, i.e. pneumococci adhere to pneumococci of the same type but not to typhoid bacilli, typhoid bacilli to typhoid bacilli, but not to pneumococci, and so on.

These results, so far consistent, accord well with the lattice hypothesis put forward by Marrack, but are difficult to explain on the current view that flocculation occurs in two stages, the first specific, the second non-specific.—A. W. S.

Basset, J. (1935). Essai sur l'immunité. [**Immunity**].—*Rev. vét., Toulouse.* **87.** 65-128. 1 plate.

Absolute natural immunity is found more often in the case of the ultraviruses than in that of the pathogenic bacteria. The author found that artificial chilling of the body did not affect adversely the resistance of the fowl to anthrax. He maintains that phagocytosis and the elimination of bacteria by the usual channels are of secondary importance in relative or individual natural immunity, and that the principal factor is the permeability of the bacterial envelope by the surrounding nutritive medium, the former increasing as the latter becomes more favourable following necrosis of the tissues by traumatism, simple haemorrhage or bacterial endotoxins.

Relative to premunition by BCG, it is emphasized that immunity is established only when the vaccine has induced a state of allergy, as demonstrated by reaction to the tuberculin test, and that this state may be reached only after several inoculations.—Norman Bisset.

Campbell, A. C. P., Drennan, A. M., & Rettie, T. (1935). **The Relationship of the Eosinophile Leucocyte to Allergy and Anaphylaxis.**—*J. Path. Bact.* **40.** 537-548. 2 tables, 1 chart. [32 refs.]

The function of the eosinophile leucocyte and the mechanism of production of eosinophilia remain amongst the most obscure questions in haematology. Many pathological conditions are known to be associated with a local or blood eosinophilia, and in this paper the authors have examined the relationship of the eosinophilia to allergic conditions brought about by the administration of foreign proteins. It was found that local and general eosinophilia were frequent, though not constant, accompaniments of allergic inflammation in guinea pigs, and that it was the allergic reaction rather than the foreign protein *per se* that stimulated the eosinophilia. Local eosinophilia was not produced by the injection of foreign proteins if an allergic reaction did not occur and blood eosinophilia was only produced on reinjection under conditions compatible with the occurrence of an allergic reaction. An interesting and important finding was that pre-existing blood eosinophilia did not appear to have any protective action against the occurrence of allergy or general anaphylaxis.—James Stewart.

Duran-Reynals, F. (1935). **The Extent of Local Dispersion of Infectious Agents as a Factor in Resistance to Infection.**—*J. exp. Med.* **61.** 617-642. 4 text figs., 4 figs. on 1 plate, 11 tables. [27 refs.]

In a recent article by the author [(1933). *J. exp. Med.* **58.** 451.] it has been shown that the extent of dispersion of an infective agent, caused by testicular or other agents, influences the size of the resulting lesions. It has been observed that, in the case of bacteria, a critical concentration exists below which no reaction will occur, and above which the intensity of the response is approximately proportional to the strength of the bacterial emulsion.

These findings have now been extended to several types of bacteria. The result, as a whole, indicated a fair uniformity in the distribution of bacteria mixed with testicle extract shortly after injection. The amount of spread varied, however, according to the virulence of the organisms. The development of virus lesions was also enhanced by testicle extract, but in this case the degree of dispersal was uninfluenced either by dilution or by the virulence of the strain employed. Enhancement of the lesions by the spreading factor was obtained with quantities of virus approaching a minimal infective dose. A further difference was noted between the two groups in immunized animals. With highly virulent bacteria, e.g. pneumococcus Type I, inhibition took place in animals partly immunized with specific antiserum whereas, in similar experiments with vaccinia, no suppression occurred.—R. E. Glover.

Handler, B. J. (1935). **Studies on the Trypanocidal Power of Normal Human Serum.**—*Amer. J. Hyg.* **21.** 18-26. 3 tables. [14 refs.]

This article records investigations undertaken to ascertain the causes of the discrepancies between the results of earlier workers on this subject. The author found that human sera, stored in a refrigerator, had lost a considerable proportion of their trypanocidal power within 48 hours. The results also indicated that the trypanocidal agent in normal human serum is capable of producing an antibody. When sufficient antiserum, prepared against untreated human serum, is added to normal human serum *in vitro*, neither the supernatant fluid nor the precipitate display any trypanocidal activity, but when an antiserum prepared against heated human serum is added, the trypanocidal power of the supernatant fluid is not diminished.—U. F. Richardson.

Culbertson, J. T., & Strong, P. S. (1935). **The Trypanocidal Action of Normal Human Serum. The Nature of the Substance Responsible for the Trypanocidal Effect and its Relationship with the Bactericidal Activity of Normal Human Serum.**—*Amer. J. Hyg.* **21.** 1-17. 10 tables. [19 refs.]

This article records experiments carried out to investigate the nature of the trypanocidal substance of normal human serum. The authors consider that this substance is not identical with complement or any of the component parts of complement, as it reacts differently to heat, filtration and ammonification. It is suggested that the trypanocidal substance is a relatively non-specific antibody, perhaps similar to the substance responsible for bactericidal activity. There appeared to be some degree of correlation between the bactericidal titre (against *Salmonella typhi*) and the trypanocidal titre of various samples of normal human serum.—U. F. Richardson.

DISEASES, GENERAL.

Nicolle, C. (1935). Signification de la forme inapparente dans la naissance et dans le declin des maladies infectieuses. **[The Implications of "Inapparent" Forms of Disease].**—*Arch. Inst. Pasteur Tunis.* **24.** 1-7. [1 ref.]

A short review on the significance of " inapparent " forms of disease. The author suggests that the phenomenon occurs under two headings, viz. in individuals naturally susceptible to a particular infection, and in naturally refractory animals when infected by artificial means (experimental typhus in the rat). It is considered that these two states are probably different.

It is suggested, further, that an " inapparent " form of a disease may progress in two distinct directions. On the one hand, it may represent a stage in which an organism or virus is declining in invasive powers in the direction of saprophytism: on the other hand, it may indicate the commencement of a change from low pathogenicity to high virulence. It is admitted that the transformation of an infective disease from its " inapparent " form to the clinical stage, while it is extremely probable, has not been actually established, but it is claimed that experimental proof has been furnished that the " inapparent " form of an infectious disease in a naturally refractory animal modifies the infective agent in susceptible species in the direction of complete extinction. [The term " inapparent " is used as indicating a condition which for a given species is constantly in a non-clinical phase, e.g. the experimental transmission of typhus fever to the rat without visible reaction on the part of the host].—R. E. Glover.

. (1933). **Report of the Special Committee on Poultry Diseases [U.S. Livestock Sanit. Ass.].**—*J. Amer. vet. med. Ass.* **83.** 520-522. [2 refs.]

The committee reviews the position with regard to several important diseases of poultry.

Salmonella pullorum infection continues to be one of the most important diseases of poultry and testing for the detection of carriers is carried out on a large scale with good results. The tube method is the test most generally employed and is officially preferred. The rapid method is used, but the committee state that, so far, there is not sufficient work published to permit statements about this test and that it must be considered to be in the experimental stage.

Laryngotracheitis continues to be a serious cause of loss in chickens. The Massachusetts plan for the control of the disease is based upon hygiene and sanitation, particularly directed at elimination of the carrier bird. The plan provides for the disposal of all birds passing through outbreaks or left on premises where outbreaks have occurred. Cleaning and disinfection are then carried out before restocking.

Reference is made to Beaudette and Hudson's method of vaccination, using a living virus. The members of the committee state that its use is an experimental procedure and that great care should be exercised in its employment as a control measure.—Norman Dobson.

—. (1935). **Report of Committee on Transmissible Diseases of Swine. [U.S. Livestock Sanit. Ass.]**—*J. Amer. vet. med. Ass.* **86.** 361-362.

Swine fever is still the major swine problem, although the virus associated with outbreaks in the United States during 1934 was apparently of low virulence. Swine erysipelas, abortion and intestinal diseases are increasing.

Acute enteritis has become more prevalent than the chronic form associated with *Salmonella cholerae-suis* infection, which formerly predominated. Certain of these acute outbreaks have been found to be associated with salmonella and coccidia, while spirochaetes, amoebae, trichomonads and *Balantidium* have been identified in cases of acute haemorrhagic enteritis, which are also becoming more numerous.
—Norman Bisset.

HINSHAW, W. R. (1933). **A Review of Recent Investigations in Turkey Diseases.** —*Proc. 5th Pacif. sci. Congr. Victoria & Vancouver.* pp. 2969-2976. [39 refs.]

This is a review of the literature on recent investigations on the following turkey diseases :– blackhead, *Salmonella pullorum* infection, fowl typhoid, fowl pox, fungous and nutritional diseases, and a miscellaneous group, not fully dealt with, including infectious laryngotracheitis, coccidiosis, tuberculosis, fowl cholera and diseases due to metazoan parasites.

Turkeys are susceptible to a large number of the common diseases of fowls, and fowls play an important part in the transmission of turkey diseases. Recent work on the relationship of the caecum worm, *Heterakis papillosa*, to blackhead has shown that the best method of controlling this disease is to eliminate contact with chickens, the commonest carriers of the worm.

Turkeys appear to be more susceptible to fungous diseases (aspergillosis and thrush) and to nutritional deficiencies than chickens. Turkeys do not appear to be susceptible to the species of coccidia affecting the fowl.—R. F. GORDON.

JULL, M. A. (1935). **The Mortality Problem in Poultry. A Critical Review of Recent Research.**—*Harper Adams Util. Poult. J.* **20.** 239-245.

The author discusses mortality amongst poultry from two aspects, the influence of environmental factors and the influence of breeding. With regard to embryo mortality, the importance of the selection of eggs is stressed. Malformation of the embryo and the effect of diet on hatchability are discussed. Attention to hygiene is said to be the principal method of reducing the incidence of chick mortality.

The death rate amongst laying hens is discussed and the author points out that there is a tendency for a higher mortality amongst pullets from high producing dams than amongst those from low producers.—J. E. WILSON.

KOCJAN, L. (1935). Bolezni golobov v severnih krajih Jugoslavije s posebnim ozirom na enzootska paratifozna obolenja. [**Diseases of Pigeons in the Northern Regions of Yugoslavia with special reference to " Paratyphoid Infection "**]. —*Jugoslov. vet. Glasn.* **15.** 67-77. 4 figs., 4 tables. [46 refs.] [Abst. from German summary].

Infectious and parasitic diseases observed in pigeons in north Yugoslavia in 1933 and 1934 included pigeon pox, " paratyphoid infection ", fowl cholera, aspergillosis, coccidiosis, acuariasis and capillariasis.—J. E.

GRIEDER, H. (1934). Beobachtungen über Rehkrankheiten in nordostschweizerischen Jagdrevieren. [**Diseases of Deer in North-East Switzerland**].— *Schweiz. Arch. Tierheilk.* **76.** 609-617. 6 figs., 1 map. [3 refs.]

A report for the five years 1929 to 1934 on the diagnosis of causes of death in 81 deer sent for examination. With a few exceptions all the deaths were due either to lungworms (*Dictyocaulus viviparus*), stomach or intestinal worms (*Haemonchus contortus*, *Chabertia ovina*), or to nasal bots (*Cephenomyia stimulator*).

Such parasitic diseases are best prevented by ensuring a sufficiency of good food in the game reserves.—J. E.

WIRTH, D. (1934). Sammelreferat Veterinär-Medizin 1932. [**Veterinary Haematological Review for 1932**].—*Folia haemat., Lpz.* **53.** 103-111. [5 pp. refs.]

The chief points of interest are as follows :–

TECHNIQUE.

MOSER found that the normal blood volume is equivalent to about 7·5 per

cent. of the total body weight, and MILLER found that, in cattle, there is 27·7 c.c. of blood for each lb. body weight.

GOSSET studied the sedimentation rate of equine red blood cells. He concluded that variations in the volume of the clot may be due to variations in the volume of the cells themselves.

The sublimate test was used by a number of workers for the diagnosis of equine infectious anaemia : it is useful, but cannot differentiate between particular aetiological types.

ZINK studied the bilirubin content of the blood of healthy animals ; it is greatest in horses (1·7 mg. per cent.), but practically absent in cattle, sheep, goats, pigs and dogs ; none was ever found in fowl blood.

NORMAL MORPHOLOGY.

Various workers reported on the normal blood picture of horses, cattle, calves, pigs and the zebu, and KNOLL made a comparative study of the mass of erythrocytes in domestic and wild animals.

ANAEMIA.

MOCSY advanced the theory that the cause of equine infectious anaemia is a virus which does not act directly, but lives in the body as a parasite and acts as an irritant. Several workers reported results of research into the diagnosis of this disease, but no simple and exact method has been found. CAMBAU worked on anaemia of horses caused by cylicostomes and FISCHER on the anaemia of strangles. Anaemia of piglets was studied. Pigs as a species are born with a very low haemoglobin content of the blood.

LEUCAEMIA.

Lymphadenosis of cattle in the Elbe region of Germany is increasing ; it is a disease of old cows and should, therefore, be eliminated. Varied opinions on the aetiology of fowl leucaemia were expressed by different investigators. HEELSBERGEN reported the finding of avian tubercle bacilli in the lesions of what was regarded as Hodgkin's disease in man.

MISCELLANEOUS.

References to the blood picture in many animal diseases are given.

Finally reference is made to new work on the blood groups of horses, cattle and swine.—J. E.

LIÉGEOIS, F., & VERSTRAETE, A. (1934). Au sujet de la paraplégie hémoglobinurique. (Revue des faits 1932 à 1934). [**Equine Myoglobinuria Paralytica**].—*Ann. Méd. vét.* **79.** 401-411. [17 refs.]

This paper is the most recent in a series of reviews, published periodically by the authors, on advances in knowledge in regard to equine myoglobinuria paralytica. It covers the years 1932 to 1934. The more important developments during these years are recorded under their various headings.

The authors regret the small amount of new information which has come to light since their last report. Under aetiology, the only matters for record are some details in regard to predisposing causes, particularly the high incidence of the disease in the Ardennes during the severe winter of 1933 to 1934. Under symptoms, there is a reference to the bright colour of the jugular blood after an attack of the disease, noted by HANOZET.

Notes under pathology are more extensive and deal chiefly with the nature of the muscle lesions, particularly in reference to the work of DETREZ. The authors examined the calcium content of the blood of 14 cases of the disease. They find

that hypocalcaemia is not shown. Under treatment, there is a note on indications for bleeding, on the use of potassium permanganate solution intravenously, and on the value of calcium therapy and insulin injections. The paper ends with a lengthy discourse on the use of heterologous blood, particularly bovine blood, as a therapeutic agent.—C. DAVENPORT.

LEE, A. M., & SCRIVNER, L. H. (1935). **Stiff-Lamb Investigations. Preliminary Report.**—*J. Amer. vet. med. Ass.* **86.** 644-655. 5 figs., 2 tables. [13 refs.]

In this report the authors give an account of investigations carried out in Wyoming.

The condition of " stiff-lamb " is most commonly seen where lambing takes place in sheds which are used year after year. It is controlled to a very great extent by postponing the lambing season so that lambing can take place out of doors.

The main symptoms are stiffness of one or more legs and swelling of joints. The age at which lambs are affected ranges from seven to 31 days. The significant gross lesions found were purulent arthritis, white areas in voluntary and in heart muscle and ecchymotic haemorrhages and abscesses in the kidneys.

Blood and spinal fluid were negative microscopically and inoculation of a loopful into media gave no growth. Growth was, however, obtained on inoculating with 1 or 2 c.c. of blood, and three organisms were isolated. Two of these were rods, one of which was bipolar ; the third was a staphylococcus. They were not identified, but the symptoms and *post-mortem* lesions of the disease were reproduced in rabbits and in lambs by the intravenous injection of each organism.—W. J. I.

CHLÁDEK, V. (1935). Konstituční osteopathie koní. **[Constitutional Bone Diseases in Horses]**.—*Vojen. Vet.* **4.** 1-16. 3 figs. [40 refs.] [Abst. from English summary].

Osseous dystrophia of horses leading to generalized osteo-arthritis is quite common in Czechoslovakia, and is often seen in young unused horses. With regard to causation, the author suggests that the condition can be prevented by attention to the Ca : P ratio in the diet, and also that a scorbutic condition may be of significance.—J. E.

WIRTH, D. (1935). Das Stuttgarter Hunderseuche-Problem. **[Stuttgart Disease of Dogs]**.—*Wien. tierärztl. Mschr.* **22.** 129-142 and 161-176. 7 figs., 3 tables, 2 graphs. [2 ½ pp. refs.]

Many veterinary workers have noted the presence of spirochaetes in Stuttgart disease of dogs, which is always associated with an acute nephritis in addition to the characteristic haemorrhagic gastro-enteritis and buccal and lingual ulceration.

Wirth discusses the identity of this disease and leptospiral jaundice (Weil's disease) in dogs, and it is clear that they are closely interconnected and that many cases of Stuttgart disease are actually leptospiral jaundice, the icterus of which is not always evident.

Relevant clinical records from the Vienna Veterinary College show that these two diseases have a very similar seasonal incidence (old records based on *post-mortem* examination returns), being more prevalent during summer.

Spirochaetes have been found in sections of the kidney in both diseases and it has been possible to transmit a fatal leptospiral jaundice by inoculating ten puppies subcutaneously with a liver and kidney suspension from four dogs recently dead of Stuttgart disease.

Additional evidence as to whether Stuttgart disease and leptospiral jaundice

are identical is furnished by their clinical course and by the blood picture, which is characterized by a rise in the R.B.C. count and haemoglobin content, a leucocytosis, mostly affecting neutrophiles, polychromasia and an increase in blood platelets. —J. E.

Weech, A. A., Goettsch, E., & Reeves, E. B. (1935). **Nutritional Edema in the Dog. II. Hypoalbuminemia and the Augmentation of Tissue Fluid.**—*J. exp. Med.* **61.** 717-734. 4 tables, 1 chart. [8 refs.]

The manner in which oedema develops in dogs maintained on a diet low in protein is described. Pre-oedematous fullness of the tissues is observed some weeks before palpable oedema develops. Among 20 dogs the time required for the production of oedema varied from 35 to 100 days. It was found that, in general, the weight curve did not rise during the transition from pre-oedema to oedema, but increased rapidly when fluid was accumulating in the peritoneal cavity. The level of serum albumin, which is critical for the development of oedema, varied between 1·04 and 2·17 g. per cent. The authors conclude that this range is so great as to suggest that other factors are important in determining the exact time for the appearance of oedema. In 30 samples of oedema fluid, the protein concentration was from 0·02 to 0·72 g. per cent. A positive correlation was not demonstrable between the duration of oedema and the protein content of the oedema fluid. The role of tissue pressure in the aetiology of oedema fluid is discussed. It is suggested that the critical level of protein in the serum is the concentration which permits the attainment in the tissue spaces of mechanical pressure great enough to break down the restraining action of the connective tissue boundaries of the spaces.—James Stewart.

Slatineanu, A., Balteanu, I., Sibi, M., Franke, M., Veit, E., & Fildan, P. (1935). L'acétonurie dans les maladies infectieuses en relation avec l'insuffisance glycogénique du foie. [**Acetonuria and Glycogen Deficiency in Infectious Diseases**].—*C. R. Soc. Biol. Paris.* **118.** 1595-1598. [11 refs.]

The sugar content of the blood and the acetone content of the urine were estimated in cases of scarlet fever, diphtheria, pneumonia and septicaemia in order to find if any correlation existed between them under such febrile conditions. No correlation was found between the appearance of acetonuria and the blood sugar value, as occasionally a hypoglycaemia existed with an intense acetonuria and sometimes a hyperglycaemia. The important factor appeared to be the fever level of the patient. The authors concluded that, in contagious diseases, the presence of acetone has some relation to the fever and the blood sugar level. They suggest that no acetone appeared as long as the glycogenic function of the liver was normal but, during the febrile state, this function was not normal and acetonuria resulted owing to incomplete breakdown of proteins and lipoids occasioned by the absence of the necessary carbohydrates during fever conditions.—J. S.

Bendinger, G., & Rshanitzina, I. (1935). Ueber spontane Avitaminose der Schafe. [**Avitaminosis in Sheep**].—*Tierärztl. Rdsch.* **41.** 191-194. 2 figs. [18 refs.]

A disease is observed in sheep towards the end of winter which by its clinical and pathological appearance may be described as an acute, diffuse, parenchymatous hepatitis, opisthotonus being a characteristic symptom. In the authors' opinion it is produced by an avitaminosis B or a polyavitaminosis. The disease occurs mostly in old sheep. Cure is effected by giving vitamin-containing foods and by treatment of the digestive disturbances.—G. D. Shearer.

Bayer, O. (1933). Kropf und Kretinismus bei Hunden. **[Goitre and Cretinism in Dogs].**—*Prag. tierärztl. Arch.* **13.** 115-121.

A short summary of the aetiology, German classification, symptoms, prophylaxis and treatment of the disease in the human being is given, no complete investigation having so far been carried out in the lower animals. All this information is taken direct from available medical literature, and the author makes no original observations. The various theories regarding the aetiology are very briefly discussed, and no mention is made of the recent and very important work of Marine and collaborators in America regarding the part played by cyanides in goitre. [A good account can be obtained from almost any recent standard textbook in human pathology or from Aschoff – (1924) " Lectures on Pathology ", New York : Hoeber – and, from the point of view of veterinary literature, from Nieberle & Cohrs – (1931) " Lehrbuch der speziellen pathologischen Anatomie der Haustiere ", Jena : Gustav Fischer. Information regarding recent advances in goitre research is available in the *Proc. int. Goitre Conf.* (1933) Berne ; Swiss Goitre Commission].

In this paper only a very brief account of a few cases in dogs personally seen by the author is given, and the statement is made that between 20 and 30 per cent. of dogs in Gablonz, Czechoslovakia suffer from goitre. Of 278 dogs examined clinically, the thyroids were palpably enlarged in 42.—J. R. M. Innes.

Hughes, E. H. (1934). **Some Effects of Vitamin-A-Deficient Diets on Reproduction of Sows.**—*J. agric. Res.* **49.** 943-953. 3 figs., 3 tables. [7 refs.]

Two experiments were undertaken involving 15 sows in each. These were divided into groups receiving different rations. The main constituent in all the diets was rolled barley. To this was added, alone or in combination, sodium chloride, calcium carbonate and casein and, as an additional source of vitamin A, alfalfa hay or cod liver oil. All the sows which did not receive either the hay or the cod liver oil proved barren. It is concluded that barley does not contain enough vitamin A for the development of fertility in pigs.—Henry Dryerre.

Elder, C., & Uren, A. W. (1935). **Pregnancy Disease in Sheep.**—*Bull. Mo. agric. Exp. Sta.* No. 345. pp. 15. 4 figs.

A semi-popular account is given of pregnancy toxaemia as it affects ewes in Missouri.—J. R. Greig.

Godden, W., & Duckworth, J. (1935). **Variations in Serum-Magnesium and in the Partition of Serum-Calcium in Normal Parturition and in Milk Fever.**—*Bio-chem. J.* **29.** 445-455. 1 table, 3 graphs. [15 refs.]

Blood samples were withdrawn from nine cows on the days preceding and succeeding parturition. Three were normal calvings, three were cases of milk fever, and three were doubtful milk fever. In all cases but one the serum magnesium rose after parturition. The serum calcium fell in all instances. The calcium loss was differentiated between that which was adsorbable on barium sulphate and that which was non-adsorbable (protein-bound calcium, plus Ca ion). The fall in the adsorbable Ca was roughly proportional to the fall in the total Ca. In the milk fever cases the condition became acute only when the serum content of both the adsorbable and the non-adsorbable Ca coincided at their minima. The greater loss was seen in the adsorbable Ca, which in one case reached 10 per cent. of the normal value. The non-adsorbable Ca was never less than 40 per cent. of the normal. In one of the milk fever cases, 12 minutes after the injection of calcium gluconate, the total Ca rose from 4·5 to 6·6 mg., the non-adsorbable Ca from

2·9 to 4·7 mg. and the adsorbable Ca from 1·6 to 1·9 mg. During recovery from milk fever there is a simultaneous rise of both Ca and Mg in the serum.—H. D.

Tatezawa, E. (1935). Studien über die Kolik des Pferdes. I. Ein Beitrag zur Kenntnis des Harnes kolikkranker Pferde, besonders zu diagnostischen Bedeutung von Glykosurie. [**Studies on Equine Colic : I. The Urine in Colic Cases**].—*Münch. tierärztl. Wschr.* **86.** 121-123. 1 table. [15 refs.]

During the study of 100 cases of intestinal colic it was found that the volume of urine excreted during the course of this condition is decreased. Brown pigmentation and changes in the smell of the urine are of grave prognostic significance. During colic the reaction may become acid and the specific weight may be decreased. The albumin, haemoglobin, bile, indican and glucose content are frequently raised. A table showing the relative incidence of these changes is given. —E. J. Pullinger.

—. (1934). **Diseases and Pathological Conditions of Cattle adversely affecting Reproduction and Breeding Efficiency.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 44-46. 1 table.

The various factors contributing to sterility are referred to, and a table is given showing the results of tests for bovine contagious abortion on a total of 586 herds. The highest percentage of reactors was found in the group " cows ", with 6·8 per cent. at the initial test. About 20 per cent. of herds contained reactors. —J. E.

Konopinski, T., & Przegalinski, A. (1934). Zagadnienie współzaleznosci pomiedzy liczba prosiat w miocie a telnoscia prosiat. [**Correlation between Litter Size and Mortality in Pigs**].—*Roczn. Nauk rol.* **33.** 245-256. 9 tables. [3 refs.] [German summary]. [Copied *verbatim* from *Anim. Breed. Abstr.* **3.** 49. Signed T. Marchlewski].

Examination of 250 litters of Large White and 310 of the Improved Native Breed shows that the lowest mortality is found in medium-sized litters. In very large and abnormally small litters the post-natal death rate in the first weeks of life is higher. The authors think, however, that by using judicious selection for general vitality it will be possible to reduce the death rate even in fairly large, though not in very large litters.

Frank, E. R. (1934). **The Role of Ovarian Extract in Bovine Sterility.**—*Cornell Vet.* **24.** 75-79.

The author has prepared and used an extract of ovarian tissue. Details of the method of preparation of the extract and of the dosage used are given. The cases upon which the extract has been used were those in which physical examination and history failed to reveal the cause, but in which some irregularity in oestrum was shown.

The following are included among examples given to illustrate the value of the treatment. In two groups of heifers treated, 38 animals in all, 90 per cent. conceived at the first service after treatment. Of 50 individual animals treated, 90 per cent. conceived at the first service and the remaining 10 per cent. at the second service.

In a group of 40 heifers served in spring, 25 were found on examination in June to be non-pregnant. These were treated and on examination in September, 20 were found to be pregnant.—W. J. Ironside.

Mitchell, C. A., Walker, R. V. L., & Humphreys, F. A. (1934). **Infectious Vaginitis.**—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 46-47.

This is a continuation of the work of the previous year [this *Bull.* **5.** 149]. Evidence that a virus was aetiologically concerned was obtained in some instances, and uniformly negative results were obtained with various bacteria isolated from clinical cases, except with a leptothrix, which set up a vaginitis in one of three test cattle. Various chemical agents were tested for therapeutical purposes, with negative results.—J. E.

Crane-Lillie, Margaret, & Rhoads, C. P. (1934). **Pathology of the Central Nervous System in Canine Black Tongue.**—*Arch. Path. Lab. Med.* **18.** 459-472. 5 figs., 1 table. [18 refs.]

The brains and spinal cords from 12 dogs which had died of experimental black tongue were examined histologically by modern neuropathological technique.

The lesions which were demonstrated by Weigert's and other similar techniques were, although slight, quite definite and consisted of disintegration of myelin sheaths ; degenerative changes in nerve cells were also observed. It appears that these changes are due to a lack of some unidentified factor which in all probability is vitamin B_2(G).

The lesions bear a close resemblance to those of human pellagra. This fact, together with the similar pathology in other organs, the similar symptoms and the almost identical preventive and therapeutic measures of the two diseases, appears to indicate that black tongue and human pellagra are aetiologically related [see also this *Bull.* **5.** 517].—J. R. M. Innes.

Pallaske, G. (1935). Hirnbefunde bei septischen Erkrankungen von Tieren mit cerebralen Erscheinungen. **[Brain Lesions in Septicaemia with Cerebral Symptoms].**—*Arch. wiss. prakt. Tierheilk.* **69.** 33-42. 2 figs. [2 refs.]

In severe septic conditions in animals, cerebral symptoms are often seen which are not to be explained on a clinical basis. The author states that, if trouble is taken to carry out a histological examination of the brain in such cases, proof can be obtained to show that the cerebral symptoms have been caused by spread of the infection to the brain with the production of foci of softening and necrosis. Four such cases in dogs are described in detail.—J. R. M. Innes.

Salomon, S. (1934). Beiträge zur Differentialdiagnose beim " Festliegen " des Rindes unter besonderer Berüchsichtigung der Neurofibromatose und der Lymphadenose (Leukose). **[The Differential Diagnosis of "Immobility" in Cattle with Particular Reference to that caused by Neurofibromatosis and Lymphadenosis or Leucosis].**—*Berl. tierärztl. Wschr.* **50.** 821-822. [12 refs.]

This is a brief general discussion of the different diseases of cattle which cause the animal to become extremely lethargic to the point of complete immobilization, but without any true paresis. In particular the author discusses briefly the type associated with what has been termed by various authors " false neuroma " or neurofibromatosis. This usually causes an intense neoplastic fibrous proliferation of nerves such as the brachial plexus.

Difficulty is sometimes encountered in differentiating clinically this condition from a true lymphadenosis, in which leucaemic infiltration of nerves and of the epidural space has occurred with consequent pressure symptoms. Naturally it is suggested that blood examination may be of help in the differential diagnosis. —J. R. M. Innes.

Sebileau, P. (1935). La paraplégie des poussins de cinq à six semaines. **[Paralysis in Five to Six-Week-Old Chickens. (Vitamin Deficiency)].**—*Rev. Path. comp.* **35.** 408-429. 3 figs. [9 refs.]

In the introduction, the author points out that leg weakness was known previous to the use of battery brooders and goes on to discuss the findings of certain workers. He kept four batches of chicks in a battery and fed them on a diet which was made up for adult fowls, in order to determine the effect of feeding large quantities of animal protein, in this case fish meal. Thirty-six chickens developed paralysis between five and six weeks of age. The symptoms are given in detail but the points of main importance are that the legs only were affected ; the paralysis was bilateral and flaccid in character, and the extensor muscles were affected. There was no evidence of rachitic changes. Only one bird died but most of those affected would have succumbed from starvation if they had not been isolated and given special treatment. Recovery followed the addition to the diet of fresh meat, yeast, and sugar beet pulp, and the administration of cod liver oil and " aviorrhone ". The unaffected chickens were kept successfully on the original diet. The author discusses the significance of his findings and points out the resemblance to beri beri. He concludes that such mild forms of paralysis are more probably the result of avitaminosis than a form of neurolymphomatosis (fowl paralysis).—J. E. Wilson.

Roberts, R. S. (1935). **The Epidemiology of Fowl Paralysis as an Indication of its Mode of Transmission.**—*Vet. J.* **91.** 127-132.

Outbreaks of fowl paralysis on seven farms were investigated, five of these being newly established farms and the ground not having been previously used for poultry. The stock under observation was introduced by the purchase of eggs and day-old chicks, the source of which was known, and in each case the disease was confined to birds of one source. There was no evidence that the disease was transmitted by contact. The mortality noticed was in certain cases over 50 per cent. [this is higher than is generally reported]. On one farm eggs from diseased stock were hatched and 500 pullets reared and observed up to 15 months without any evidence of fowl paralysis.

The author concludes that the appearance of fowl paralysis in a flock seems to be related to some factor existing in the parent stock.—J. E. Wilson.

Hartwigk, H. (1935). Zur Diagnostik der Marek'schen Hühnerlähme. **[Diagnosis of Fowl Paralysis].**—*Dtsch. tierärztl. Wschr.* **43.** 33-37. 4 tables. [8 refs.]

The diagnosis of fowl paralysis may depend upon clinical evidence, or upon the macroscopical or microscopical lesions seen at autopsy. Out of 203 instances of this condition, characteristic symptoms were seen in 159 cases, whilst in 44 cases symptoms were present but were unconvincing. Characteristic symptoms include depigmentation of the iris, alterations in the shape of the pupil, and lameness. Out of 253 birds, 98·5 per cent. of those showing macroscopic lesions proved to be affected when examined histologically, but only 40 per cent. of those showing no macroscopic lesions proved, on histological examination, to be free from the disease. Histological lesions of the nervous system and brain are described [see this *Bull.* **4.** 533, and **5.** 91.] and fixing and staining methods for the examination of such material are noted. Evidence is presented to show that birds affected with fowl paralysis are more prone to parasitic infestations than are normal birds. —E. J. Pullinger.

JUNGHERR, E. (1934). **Studies on Fowl Paralysis. I. Diagnosis.**—*Bull. Storrs agric. Exp. Sta.* No. 200. pp. 28. 7 figs., 5 tables. [50 refs.]

The experimental work was planned to follow the pathogenesis of the disease in inoculated birds by the application of various clinical tests. The birds were kept under observation for an interval which was at least 50 per cent. longer than the estimated incubation period. Day-old chicks were used from flocks in which the disease incidence was known, and were inoculated by various routes with material from gross lesions of cases of fowl paralysis and, in one instance, with blood from a case of myelocytic leucosis, the birds being reared in sterilized batteries.

The clinical tests were applied, approximately at the age of one, two and three to four months, at the end of which period the birds were killed and subjected to a thorough pathological examination.

In 347 determinations of the total leucocyte count by the indirect Forkner and direct Shaw methods, on the same sample, the average difference between the values was 8,500 leucocytes per c.mm.

Total and differential leucocyte counts were made on the experimentally infected and control birds of varying ages. Suspicious and positive birds seemed to show a rise in the leucocyte count in the larger proportion of cases, according to the percentage of distribution. The mean values of the total leucocyte count and the percentage of lymphocytes and budded lymphocytes also seemed to suggest slight differences between negative and positive birds. In the light of statistical analysis, these differences appeared to be due to chance variations. An important point brought out in this study was that the absolute and relative lymphatic character of the blood of birds kept under laboratory conditions became markedly accentuated.

The mercury bichloride test and a modified guttadiaphot test were used. The results appear to show that they may be of value from the diagnostic point of view in pronounced cases as seen in the field. Cases of entero-hepatitis and taeniasis occasionally gave positive reactions with the mercury bichloride test.

Transmission experiments were carried out, but the results obtained did not permit of any definite conclusions as to the transmissibility of the disease, but pointed out the importance of suitable experimental poultry stock in transmission experiments.

A histological examination was made of nervous and other tissues with variable results. In the experimentally produced cases, the peripheral nerves were singularly free from lymphoid areas, with the exception of the dorsal root of the brachial plexus, which showed such changes in a high percentage of specimens.—N. D.

RUBARTH, S. (1934). Några fall av primära mag- och tarmkarcinon hos husdjuren. [**Primary Gastro-Intestinal Carcinoma in Domestic Animals**].—*Skand. VetTidskr.* **24.** 685-706. 3 figs. [36 refs.] [English summary : abst. from orig.]

The author gives a detailed description of eight cases of primary gastro-intestinal carcinoma in domestic animals.

IN HORSES.—One adeno-carcinoma originated from the pyloric region of the stomach ; one papillomatous adeno-carcinoma from the duodenum had produced secondary growths in the mesentery and liver, and displayed islands of ossification and eosinophile infiltration in its connective tissue ; one ulcerative adeno-carcinoma from the mucous membrane of the small colon, with metastasis in the mesentery and foci of ossification ; one ulcerative adeno-carcinoma from the ileum displayed ossification and eosinophile infiltration in its stroma, and one

epidermoid carcinoma from the anus extended into the rectum, secondary growths having developed in the regional lymph glands.

In Dogs.—One adeno-carcinoma from the jejunum and one from the rectum with numerous metastases in the mesenteric glands and liver, and one adeno-carcinoma from the rectum with secondary growths in the mesenteric glands.

In a Cat.—One ulcerative carcinoma from the caecum, with contact metastasis in the colon.

In conclusion, the author mentions some cases of primary gastro-intestinal carcinomata in domestic animals which are described in the literature. They are few compared with those described from human beings.—G. N. (Farsund).

de Monbreun, W. A., & Goodpasture, E. W. (1934). **An Experimental Investigation concerning the Nature of Contagious Lymphosarcoma of Dogs.**—*Amer. J. Cancer.* **21.** 295-321. 9 figs. on 3 plates. [29 refs.]

The questions of the origin, type of cell present and infectivity of the so-called contagious lymphosarcoma or venereal sarcoma in dogs and whether the growth is in reality a true neoplasm have for long been debatable points. This is an important paper which attempts to clear up much that has remained for so long unsettled, and should be read in the original. Reference might also be made to an article by Stubbs and Furth [this *Bull.* **5.** 516.] as the results in both papers have much in common.

No evidence has been obtained from a series of experiments that a virus or any other infectious agent is concerned in the aetiology. The growth is a true neoplasm which can only be transmitted by inoculation of living tumour cells upon ulcerated surfaces or by direct subcutaneous injection ; multiple tumours may be also produced by the intravenous injection of tumour cells in suspension. The authors contend that the type cell is derived from the lymphocytic series. The growth of the tumour is associated with a variable immunity to reinoculation, although a substantial immunity can be broken down by the injection of large quantities of tumour cells.—J. R. M. Innes.

Holz, K. (1935). Latenz endokranieller Neubildungen beim Pferde. [**Latent Endocranial Tumours in Horses**].—*Berl. tierärztl. Wschr.* **51.** 289-295. 9 figs. [1 ref.]

This is a further contribution by the author on the subject of cranial tumours in horses [see this *Bull.* **5.** 289 and 516]. He describes ten cases of intra and extra-cerebral tumours (eight of the well-known and common cholesteatomata, one case of secondary multiple sarcomata, and one case of gliosarcoma). It is shown that these tumours, irrespective of their type, may be present for some time without causing any noticeable symptoms. The history, symptoms and *post-mortem* findings are given in detail.—J. R. M. Innes.

Baumann, R. (1935). Zur pathologischen Anatomie der Granulosazelltumoren des Eierstockes. [**Granulosa Cell Tumours of the Ovary**].—*Wien. tierärztl. Mschr.* **22.** 193-202. 3 figs. [50 refs.]

Although the majority of primary ovarian tumours in women are undoubtedly carcinoma, it is quite definitely recognized that there is an uncommon type of tumour which arises from granulosa cell nests. The growth has also frequently been referred to as a folliculoma. The tumour is composed of solid alveoli of cells which are morphologically very similar to the ordinary granulosa cells. Further proof that these are definitely follicular cells is evident from the fact that patients may suffer from post-menopausal haemorrhage and endometrical hyperplasia due

to the production of the female sex hormone, folliculin. The tumours are always one-sided and of low-grade malignancy, metastasis being very rare.

A similar differentiation of tumours in animals has so far not been made, although the author mentions a case described by Loeb (1901) in a six-month-old calf which was designated as a " luteoma ". Six cases of this type of tumour in cows are described in this paper. The cells present showed a very close similarity in appearance to granulosa cells of ripe Graafian follicles ; small cysts were occasionally seen. Apparently the tumours were functionally active and had produced some hormone as the uterine mucous membrane was very hypertrophic and mucin production was intense. It appears, therefore, that an analogous tumour to the granulosa cell carcinoma of women occurs in cows.—J. R. M. Innes.

PUBLIC HEALTH.

I. Rabagliati, D. S. (1935). **The Importance of the Veterinary Profession in Public Health Administration.**—*Vet. J.* **91.** 99-113. [1 ref.]

II. Rabagliati, D. S. (1935). **Milk and its Relation to Public Health, with Special Emphasis on the Value of Veterinary Science in Ensuring a Clean Milk Supply.**—*Ibid.* 113-127. [14 refs.]

I. In this paper the author defines veterinary public health as :- (1) the control of animal disease from a purely economic standpoint, and (2) the control of animal disease from the point of view of human health. He points out that the laws and regulations in force in Great Britain in connection with animal diseases are complex and in many cases overlapping. The history of this legislation in connection with animal diseases is described as a story of indifference, ignorance and gross prejudice, whereby vested interests have too frequently been allowed to interfere with progress.

The first legislation enacted in this country to combat contagious disease was against sheep scab in 1798. An Act was introduced in 1853 in connection with glanders, this being the first Act affecting an animal disease communicable to man. The first real practical step in regulating the control of disease was the result of the outbreak of rinderpest in 1865. About this time John Gamgee pointed out the danger run by the public from the consumption of diseased flesh ; he was the originator of our meat inspection laws. The author further points out that in England the efforts made by the veterinary profession in connection with meat inspection have not been recognized, nor has that profession been employed for the purposes of meat inspection to the same extent as in other countries.

Up to 1865 no efforts had been made to reduce the other animal diseases in the country, though it was recognized that foot and mouth disease, contagious bovine pleuro-pneumonia, anthrax, sheep scab, swine fever and rabies had been prevalent for a long time. In 1864 a Bill was introduced for the prevention of contagious disease among cattle, but owing to the great opposition from stock owners, it was withdrawn. The Act of 1875 empowered the Privy Council to make orders relative to dairies, cowsheds and milkshops. These powers, however, were not made use of until 1885. The Act of 1878 was replaced by that of 1894, which is the main act of to-day. The author describes the Tuberculosis Order, traces the milk inspection orders down to the present day and gives details of the legislation with respect to glanders, rabies, foot and mouth disease and anthrax.

II. Milk is a perfect food, also a dangerous one, as it is a good medium for the growth of micro-organisms. To prevent the dangers from pathogenic organisms, such as tubercle bacilli, the veterinary profession is called upon to play its part

in the national campaign for clean milk. The greatest loss in dairy herds is due to contagious abortion, mastitis, tuberculosis and Johne's disease. Science enables us nowadays to diagnose all these diseases in their early and even latent stages, and it is possible to eliminate them from any given herd.

The investigations carried out in Scotland in 1930 show that the addition of milk to the diet of children has a striking effect on improved physique and general health, and increased mental alertness. In view of the high percentage of milk sold containing living tubercle bacilli, including a percentage of milk pasteurized by the " holder process ", bovine tuberculosis eradication must be our aim. Routine veterinary examination of milking cows is of great value in eliminating a large number of cows with tuberculous udders. It seems ridiculous that such examinations are carried out in one area and neglected in the neighbouring areas. Microscopic examination of bulk samples of milk is of little use, but is helpful for individual samples. The biological test is useful in detecting the percentage of dangerous cows which clinical examination may miss, but should only be looked upon as of secondary importance compared with the work of the clinician.

In connection with contagious abortion, which is so prevalent, the agglutination or complement-fixation test should be carried out. The disease can be dealt with in three ways :– (1) by blood test of the whole herd and isolation of the reactors ; (2) by treating the herd with live vaccine, and (3) by treating the herd with dead vaccine. The first method is to be recommended.

In connection with mastitis, it is pointed out that streptococci are almost universally present in ordinary market milk. With proper veterinary treatment this disease can be eliminated from the herds. The author suggests that the diseases of the dairy herds can be kept under control or eradicated by regular veterinary supervision. The present laws dealing with animals are chaotic in this country, the responsibility being divided between the Ministry of Agriculture, the Ministry of Health and various local authorities. The author suggests new legislation and an independent veterinary department for each county and borough, to deal with the production of a clean milk supply.—Brennan DeVine.

Holmes, R. P. (1935). **The Accredited Milk Scheme : Standardisation of Cow-sheds and Dairies.**—*Vet. J.* **91.** 220-222.

The author points out that since no standards are laid down regarding the requirements of cow-sheds and dairies, it remains for local authorities to prepare their own standards.

The standards adopted in Bolton are set out in short paragraphs under 15 headings. They do not lend themselves to abstraction and those interested should consult the original article.—W. J. Ironside.

Wood-White, B. (1935). **The Inspection of Dairy Cattle Under the Milk and Dairies (Consolidation) Act, 1915.**—*J. State Med.* **43.** 1-16.

This paper, given at the Annual Congress of the Royal Institute of Public Health by the Chief Medical Officer for east Suffolk, gives experiences in tracing the source of infection of samples of milk infected with *Mycobact. tuberculosis*. About 100 samples of milk were taken yearly during 1920 to 1933 from a cattle population of 20,000 and, of these, 0·9 to 6·6 per cent. (average 3·7 per cent.) were found to be infected. Complaints were also received during the same period from other local authorities receiving milk from east Suffolk. Tabulated results are given of 40 veterinary inspections of herds found to be giving infected milk. In only 35 per cent. were the offending cows detected, and the factors influencing these results are discussed. Routine veterinary inspection of all dairy herds is

advocated and it is concluded that this would lead to the elimination of advanced cases of tuberculosis and, by limiting the amount of infection, would reduce the incidence of the disease amongst dairy cattle.—H. E. Bywater.

Hall, I. W. (1935). **Time Factors in the Pasteurization of Milk.**—*Brit. med. J.* May 11th. 972-974. 2 figs., 3 tables. [2 refs.]

A delay of some hours occurs between the production and the pasteurization of milk, especially during the winter when collections are usually made once a day only. A delay of some hours may also occur between pasteurization and delivery, with the result that milk may be anything from 24 to 36 hours old when delivered to the consumer. These delays cause progressively increasing bacterial counts and souring properties in the final product. Early pasteurization exerts a marked restraint on these factors, and it is suggested, therefore, that milk should be heated for a short period to 160°F. in the dairy prior to cooling and that, after transport, the milk should be pasteurized for a shorter period than that now specified.

[The Milk (Special Designations) Order prohibits pasteurized milk being treated by heat more than once].—H. E. Bywater.

—. (1935). Stellungnahme der Preuss. Versuchs- und Forschungsanstalt für Milchwirtschaft in Kiel zu den Ausführungen von Herrn Prof. Dr. Bongert und Herrn Dr. Hobbing in der Berliner Tierärztlichen Wochenschrift, Nr. 38-39 " Sind durch die sogenannte Kurzzeiterhitzung der Milch bei 73-75°C die in ihr vorkommenden Tuberkelbazillen mit Sicherheit abzutöten ? " **[Statement of the Dairy Research Institute, Kiel, on the Lethal Action of Flash Pasteurization of Milk on Tubercle Bacilli].**—*Berl. tierärztl. Wschr.* **51.** 43-46.

Bongert and Hobbing [(1934). *Berl. tierärztl. Wschr.* **50.** 634-636 and 649-652.] presented evidence contradictory to the claims made regarding the value of flash pasteurization for the destruction of tubercle bacilli. In reply, members of the Dairy Research Institute state that the efficiency of this type of plant was tested by adequate experiments in which all factors likely to introduce errors into the results were carefully controlled.—E. J. Pullinger.

Stockmayer, W. (1935). Vergleichende Untersuchungen über den Bangbakteriengehalt von Rahm, Butter, Mager- und Buttermilch sowie Versuche über die Konservierung von Milchproben. **[The Presence of *Brucella abortus* in Cream, Butter, Skim-Milk and Butter-Milk, and the Preservation of Milk Samples].**—*Zlb. Bakt. I.* (*Orig.*). **133.** 425-435. 2 tables. [18 refs.]

The author has applied the method of isolating *Br. abortus* from contaminated milk samples by culture on a liver agar medium containing gentian violet and malachite green, to the examination of cream, butter-milk and butter. He finds that cream from milk naturally contaminated with *Br. abortus* may contain five times as many of these organisms per c.c. as were present in the original whole milk. When the cream is made into butter the final product may contain one-half to two-thirds the number of organisms contained in the cream, some of the organisms being lost in the butter-milk.

In normal milk, stored at 4° to 8°C., the *Br. abortus* content falls slowly but these organisms are still present after seven days of storage. At a temperature of 18° to 19°C. the organisms die within two days. At higher temperatures they die even more quickly. In milk preserved with boric acid in concentrations up to 2 per cent., *Br. abortus* survives at temperatures between 18° and 24°C. for as

long as seven days, the numbers of organisms only being diminished comparatively slightly. Boric acid prevents the development of saprophytic organisms which, at warm temperatures, multiply rapidly and overwhelm the *Br. abortus*. From these results it is concluded that the addition of 1 to 2 per cent. of boric acid to milk will facilitate the examination of samples for *Br. abortus*.—E. J. PULLINGER.

BROOKS, P. B. (1935). **Some Observations on Milk-Borne Infection.**—*J. Amer. vet. med. Ass.* **86.** 342-347.

The author criticizes the incompleteness of the records regarding milk-borne infection in the United States of America, and attempts to supply some further details regarding undulant fever and septic sore throat in human beings. Various figures are given and generalizations drawn, it being considered that the majority of cases of undulant fever have been due to the consumption of raw milk from herds infected with contagious abortion. Furthermore, in nearly all the cases where bacteriological study has been made in the author's laboratory, the organisms were of the bovine type. Although the actual figures suggest that undulant fever is insignificant from a public health standpoint, he believes that the cases reported only present a fraction of those actually existing.

Concerning septic sore throat, most of the recent outbreaks could be traced to cows affected with mastitis, and occasionally it has been possible to find the human carriers who apparently affected the cows, haemolytic streptococci of human type usually being isolated.—R. LOVELL.

—. (1935). **Milk Supplies and Tuberculosis.**—*Med. Offr.* **53.** 4 and 7.

This is a memorandum of the Council of the National Association for the Prevention of Tuberculosis with reference to the report of the Cattle Diseases Committee of the Economic Advisory Council. The report is considered to be of first importance in relation to the eradication of tuberculosis, which is the ultimate aim of the Association. Owing to the risk of infection to man, more effective measures should be instituted to render the milk supply safe, but it is realized that economic and other interests must receive consideration. Environmental conditions are important in the spread of both human and bovine tuberculosis. Milk is a necessity of life and the citizen is entitled to claim that milk should be clean and safe. The amount of milk consumed *per capita* in this country is much below that which could be used advantageously, but it cannot be urged that this amount should be increased unless it is produced and distributed under clean conditions and is free from the risk of conveying tuberculosis. The quality and safety of milk cannot be left to producers who may be ignorant of the facts regarding the disease in cattle and the risk of infection in man. A scheme should be developed to produce and distribute milk on a national basis as recommended in the report. The success of the National Scheme for the Prevention and Control of Tuberculosis in human beings provides an example and indicates the lines to be adopted for cattle. Uniformity of method must be observed. A central authority should issue directions for the conduct of veterinary examinations, but the actual choice of a veterinary officer for a given area should rest with the local authority. A necessary purpose of the scheme should be to raise the general level of veterinary inspection and practice. It is noted with approval that the report gives prominence to certified milk and emphasizes that all milk should be sold under official designations easily recognizable by the public. The present designations are unintelligible and have hindered progress. The recommendations made with regard to "sterilized" milk are considered to lead to confusion.

Total eradication of tuberculosis is the only complete solution of the problem

of tuberculous milk, and has been accomplished in Denmark and also largely in the United States of America. Meanwhile an effectively controlled system of pasteurization should be initiated and continued until eradication is well under way.

Production costs will increase but it is essential that the retail price of milk should not be raised above the ordinary means of the poorer classes. Expenditure will be considerable but should not fall on any one group of the community, least of all on the consumer, otherwise an increased consumption of milk will not materialize. The establishment of a clean and safe milk supply concerns the highest interests of the state, and the Association expresses the hope that the Government will do its part in a liberal spirit.—H. E. Bywater.

Toman, J. (1935). K diagnostice kozího másla ultrafialovými paprsky hanavské lampy. [**The Detection of Goat's Butter by Ultra-Violet Rays**].—*Zverolék. Obz.* **28.** 67-68.

The author examined goat's butter by ultra-violet rays (Hanau mercury lamp) and found that its fluorescence is quite different from that of cow's butter, being white with a slight violet colour. The fluorescence of cow's butter is yellowish. It is possible to detect by ultra-violet rays goat's butter when mixed with cow's butter, even if only 20 per cent. goat's butter is present in the mixture.

—E. Pribyl (Brno).

Houdinière, A. (1935). Présence d'acétone dans la viande de bovins. [**Acetone in Beef**].—*Bull. Acad. vét. Fr.* **8.** 233-238. [6 refs.]

A hind quarter of beef was observed to have a slight congestion of the fat and to possess a marked odour of acetone. This odour remained after 24 hours' hanging and even after cooking. Analysis of the muscle showed acetone to be present to the extent of 23·5 mg. per 100 g. muscle. Parallel analysis of normal animals gave figures of 12 to 12·5 mg. acetone. The seized animal was found to be a carcass of a cow that developed milk fever after calving and had to be slaughtered. The author discusses the question of the acetone production being a symptom of, or a condition entirely different from, milk fever.—W. R. W.

I. Kathe, Klimmeck, & Standfuss. (1934). Ueber die Gefährlichkeit von Bakterien der Enteritisgruppe zur Vertilgung tierischer Schädlinge. [**The Danger of Rat " Poisoning " Bacteria for Man**].—*Veröff. MedVerw.* **44.** No. 1. [Abst. from abst. in *Z. Fleisch- u. Milchyg.* **45.** 272].

II. Schumann. (1935). Bemerkungen zu der Arbeit von Kathe, Klimmeck und Standfuss über die Gefährlichkeit der Verwendung von Bakterien der Enteritisgruppe zur Vertilgung tierischer Schädlinge. [**Note on the Work of Kathe, Klimmeck and Standfuss on the Danger of Using Paratyphoid Bacteria for Vermin Control**].—*Z. InfektKr. Haustiere.* **47.** 245-249. 2 tables. [1 ref.]

III. Bahr, L., & Rautmann, H. (1935). Einige kritische Bemerkungen zu der Veröffentlichung Dr. Kathes, Dr. Klimmecks und Dr. Standfuss' " Ueber die Gefährlichkeit der Verwendung von Bakterien der Enteritisgruppe zur Vertilgung tierischer Schädlinge ". [**The Danger of Rat " Poisoning " Bacteria for Man**].—*Veröff. MedVerw.* **44.** No. 8. [Abst. from abst. in *Z. Fleisch- u. Milchhyg.* **45.** 272].

IV. Kathe, Klimmeck, & Standfuss. (1935). Erwiderung auf die kritischen Bemerkungen von Dr. Bahr und Dr. Rautmann zu unserer Arbeit über die Gefährlichkeit von Bakterien der Enteritisgruppe zur Vertilgung tierischer Schädlinge. [**The Danger of Rat " Poisoning " Bacteria for Man**].—*Ibid.* No. 8. [Abst. from abst. in *Z. Fleisch- u. Milchhyg.* **45.** 272-273].

I. Reference is made to the use of ratin rodent poison for killing field mice, in which no great success was obtained. A search of the literature covering 30 years was also made ; this revealed descriptions of 13 cases of illness in human beings following the use of ratin ; some case records are given. Cases of disease in domestic and wild animals from infection with this product have been observed and some such recent cases in Silesia are described. The authors consider that the use of ratin should be prohibited.

II. Schumann states that the conclusions as to the danger of ratin to animals and human beings arrived at by the above authors were hypothetical and not supported by ascertained facts. If gross carelessness in the laying of ratin is avoided, the danger of human infection is extremely slight and actual infection seldom causes dangerous illness.

III. Bahr and Rautmann also attack these authors, using arguments on similar lines. They suggest that ratin should only be available for use by persons with appropriate knowledge of hygiene who can be trusted not to leave the poison about carelessly.

IV. The authors modify their original opinion and urge restrictions in the sale of ratin. They admit that ratin is very useful against rats, but that this is not strictly comparable with its attempted use against field mice in open country.—J. E.

THERAPEUTICS.

Fischl, V., & Fischl, Lili. (1934). Arzneifestigkeit, Avidität, Interferenz. [**Drug-Fastness, Avidity and Interference**].—*Z. ImmunForsch.* **83.** 324-335. 3 tables. [20 refs.]

The authors were unable to confirm the work of Schlossberger and Menk on the effects of treating a " nagana " trypanosome strain with a gold preparation called " Sulfoharnstoff " as, in their experiments, resistance was obtained against the gold preparation but not against " neosalvarsan ", " trypaflavine " or " germanin ". When, however, the strain was also made resistant to " trypaflavine ", fastness was acquired to all the drugs tested except " germanin ".

One difficulty encountered in the study of drug-fastness is the existence of " avid " substances which retain their trypanocidal efficiency though the trypanosome strain has become resistant to nearly related drugs. Arsenophenylglycin and other drugs possess this " avidity ", but a trypanosome strain made resistant to sodium arsenite also becomes fast to all arsenicals. Schitzer has recently claimed the property of " avidity " for " myosalvarsan " and " solusalvarsan ", but the authors' work does not confirm the claim in the case of " myosalvarsan ".

Previous treatment of mice with ascorbic acid (vitamin C) was found to prevent the trypanocidal action of arsenophenylglycin and " trypaflavine " ; it must, therefore, be added to the list of substances with " interference " properties. —U. F. Richardson.

Browning, C. H., & Gulbransen, R. (1935). **Combined Treatment of Experimental Trypanosome Infections by Chemotherapeutic Agents.**—*J. Path. Bact.* **40.** 425-431. 4 tables. [25 refs.]

This article records experiments on the treatment, with " tryparsamide " and " styryl 245 ", of mice artificially infected with *Tryp. brucei*, an interval of 24 hours occurring between the administration of the two drugs. Whilst 1 : 400 " tryparsamide " and 1 : 24,000 " styryl 245 ", in combination, cured 50 per cent. of the mice treated, either drug alone, at the same dose, cured less than 5 per cent. It is

suggested that the advantage of the combination may depend upon the prolonged influence of the " styryl " compound acting on parasites weakened by the arsenical compound. As the substances differ widely, chemically, it is probable that they attack the parasites through different receptors, thus avoiding the complication of " interference ".—U. F. RICHARDSON.

BROWNING, C. H., & GULBRANSEN, R. (1935). **Variation in Chemotherapeutic Susceptibility associated with Change in Virulence of a Strain of** *Trypanosoma brucei*.—*J. Hyg., Camb.* **35.** 180-184. [4 refs.]

Experiments are recorded in which *T. brucei* was passaged through mice until maximum pathogenicity was obtained and, at various stages, treatment with a large number of drugs was undertaken. The chemotherapeutic response was weak at the time when the host was able to exercise effective resistance, but as the virulence of the strain increased the response to treatment improved.—U. F. R.

VON JANCSÓ, N., & VON JANCSÓ, H. (1935). **The Rôle of the Natural Defence Forces in the Evolution of Drug-Resistance of Trypanosomes. II. The Rapid Production of Germanin-Fast** *T. brucei* **Strains in Animals with Paralyzed Defence.**—*Ann. trop. Med. Parasit.* **29.** 95-109. 1 fig., 3 tables. [21 refs.]

This article draws attention to the previous work of the authors on the nature of the therapeutic action of certain drugs, and on the phenomena of drug-fastness and interference, by methods based on the detection of drug absorption by trypanosomes by their acquisition of photosensitiveness, by the use of fluorescent drugs, and by their absorption of drugs from a solution. From the early results obtained, the authors concluded that the majority of trypanocidal drugs are absorbed by the protoplasm and nucleus, the blepharoplast being particularly affected ; this may explain the existence of strains apparently devoid of the latter structure. Drug-fastness appears to depend upon the acquisition of impermeability, and interference is due to the absorption of other substanees and their ability to render the parasites impermeable to the trypanocidal agent.

The action of " germanin " is peculiar in that its trypanocidal value seems to depend largely on its opsonic action, and in that drug-fastness is only obtained by very prolonged treatment (100 passages). It is now recorded, however, that, in mice in which the defence mechanism had been blocked by splenectomy and the injection of copper, strains of *T. brucei* could be rapidly rendered resistant to " germanin " (ten passages). As relapse strains of such resistant organisms appearing in normal mice after treatment may show a loss of the " germanin "-fastness, it is suggested that the formation of relapse antibodies may be the important factor in the action of the defence mechanism in preventing the acquisition of drug-fastness.—U. F. RICHARDSON.

CORSON, J. F. (1934). **The Action of " Bayer 205 " on** *Trypanosoma rhodesiense* **in White Rats Infected by Tsetse-Flies.**—*Ann. trop. Med. Parasit.* **28.** 535-547. 4 tables. [22 refs.]

This article records experiments on the prophylactic value of 0·015 g. and 0·03 g. " Bayer 205 " per kg. body weight in white rats against the bites of isolated specimens of *Glossina morsitans* infected with *T. rhodesiense*. The former dose failed to protect for 20 days and the latter for 40 days. Rats were subinoculated during the relapses and tsetse flies were also infected by feeding on the rats. When the drug fails to protect, the infection is characterized by periods when trypanosomes cannot be found in the blood by microscopical examination, and it is pointed

out that attempted prophylaxis which is unsuccessful may prevent early diagnosis, and thus render treatment more difficult.—U. F. RICHARDSON.

VAN DEN BRANDEN, F. (1934). Essais comparatifs du traitement des rats blancs infectés de " Trypanosoma congolense ", par l'orsanine sodique (270 Fourneau) et par le tryponarsyl. [**Comparative Tests on the Treatment of White Rats, Infected with** *T. congolense*, **with Sodium Orsanine (" Fourneau 270 ") and with Tryponarsyl**].—*Ann. Soc. belge Méd. trop.* **14.** 375-378. [5 refs.]

" Fourneau 270 " proved toxic to white rats weighing 100 to 120 g. when given in doses of 0·1 g. Given in doses of 0·05 g. to six white rats infected with *T. congolense*, it cleared the peripheral blood of trypanosomes for ten days. Tryponarsyl in doses of 0·2 g. failed to clear the blood of trypanosomes.—U. F. R.

VAN DEN BRANDEN, F., & POTTIER, R. (1934). L'hexaméthylène tétramine associée à la tryparsamine dans le traitement de la trypanosomiase. Contrôle biologique de tryponurile. [**Treatment of Trypanosomiasis by Hexamethylene-Tetramine in Conjunction with Tryparsamine**].—*Ann. Soc. belge Méd. trop.* **14.** 499-502. [4 refs.]

In view of the value claimed for " urotropine " (hexamethylene-tetramine) as an aid to arsenical treatment in chronic cases of sleeping sickness, the authors tested its value in the form of "tryponurile," a combination of "urotropine" and tryponarsyl, in the treatment of rats infected with *Tryp. congolense*. The combination of the two drugs had no greater value than tryponarsyl used alone. —U. F. RICHARDSON.

DUKE, H. L. (1935). **Arsenic Resistance in Trypanosomes.** [**Correspondence**]. —*Lancet.* **228.** 903-904.

This letter draws attention to the work carried out in Uganda since 1929 on the resistance to arsenic of polymorphic trypanosomes, and to the use which has been made of the greater resistance of *Tryp. rhodesiense* and *T. brucei* to distinguish these species from *T. gambiense*. There is some evidence that arsenic resistance, which is a regular feature of *T. brucei* and *T. rhodesiense*, may be a natural characteristic of certain strains of *T. gambiense* apart from previous contact with arsenical drugs. No one has yet succeeded in preparing an arsenic-resistant strain of *T. gambiense* from a sensitive strain without destroying its property of transmissibility by tsetse fly.—U. F. RICHARDSON.

HASSKÓ, S. (1934). Az arsenopyridin-vegyületek hatása a baromfi-spirochaetosisra. [**Action of Arsenopyridine Compounds on Fowl Spirochaetosis**].—*Allatorv. Lapok.* **57.** 347-349. 1 table. [6 refs.] [Abst. from *verbatim* translation in *Berl. tierärztl. Wschr.* **51.** 149-151].

This article records experiments on the value of nine arsenopyridine compounds in the treatment of fowl spirochaetosis. " BR 34 " [2-pyridone-5-arseno-1-(3′-amino-4′-oxybenzol)] proved the most efficacious, 0·005 g. administered intramuscularly being sufficient to cure a hen weighing 500 g. even when in an advanced stage of the disease. The compound has the disadvantage of only slight solubility in water, and is recommended to be used as a 5 per cent. solution. It has an advantage over " neosalvarsan " in that it can be used intramuscularly instead of intravenously. It is noted that drugs differ in their effects on different species of spirochaetes, and that " BR 34 " was more active in destroying the fowl spirochaete than *Spirochaeta recurrentis*.—U. F. RICHARDSON.

VAN SACEGHEM, R. (1934). Expériences faites avec la série des Dn 7, Dn 18, Dn 20 dans le traitement de la trypanose des bovidés due à Trypanosoma vivax. [**Tests of the Series " Dn 7 ", " Dn 18 " and " Dn 20 " in the Treatment of Bovine Trypanosomiasis due to** *T. vivax*].—*Ann. Soc. belge Méd. trop.* **14.** 503-505. [1 ref.]

The antimonials " Dn 7 ", " Dn 18 " and " Dn 20 " proved no more efficacious in the treatment of *T. vivax* infection in cattle than they had proved previously in *T. congolense* infection. Whilst " Dn 7 " and " Dn 18 " caused a temporary clearing of the peripheral circulation, " Dn 20 " had no apparent effect on the trypanosome infection.—U. F. RICHARDSON.

VAN SACEGHEM, R. (1935). Souche de *Trypanosoma congolense* résistante à l'émétique chez des bovidés. [**A Strain of** *T. congolense* **Resistant to Tartar Emetic in Cattle**].—*Ann. Soc. belg Méd. trop.* **15.** 113-115. [1 ref.]

This note records observations on a strain of *T. congolense* which failed to disappear from the peripheral blood of an ox on intravenous injection of 1 g. of tartar emetic. The trypanosome resisted a series of injections of tartar emetic in this ox, and also proved resistant on subinoculation into another animal. *In vitro* the organisms survived for 15 minutes when exposed to a high dilution of tartar emetic. The author suggests that the emetic resistance had been produced by previous treatment with " Dn 7 ".—U. F. RICHARDSON.

GOUSSEFF, W. F., & SUDZILOWSKY, M. N. (1934). Wirkung subcutaner, intramuskulärer und intravenöser Injektionen von Trypanblau auf der Organismus des Pferdes. [**The Action of Subcutaneous, Intramuscular and Intravenous Injections of Trypan Blue on Horses**].—*Arch. wiss. prakt. Tierheilk.* **68.** 217-220. 3 tables.

This article records observations on the changes in the blood of horses after injections of trypan blue. The rate of corpuscular sedimentation, the bilirubin, haemoglobin and alkali reserve content, and the number of leucocytes and red cells were estimated. No constant departure from the normal was detected, but the authors conclude that there was evidence of some disturbance, and that horses under treatment should be rested.—U. F. RICHARDSON.

GOUSSEFF, W. F. (1935). Prophylaxe der Pferdepiroplasmose mit Trypanblau. [**The Prevention of Equine Piroplasmosis with Trypan Blue**].—*Berl. tierärztl. Wschr.* **51.** 213. 1 table.

In areas in Russia in which equine piroplasmosis is enzootic, cases of the disease appear in April and continue until July. In 1934, an attempt was made to reduce the annual losses by the intravenous injection of 1 g. of trypan blue in 1 per cent. solution to all the horses on a given farm five to six days after the first appearance of ticks or the appearance of the first case of disease. Out of 8,000 treated horses, 32 became infected and seven died (0·08 per cent.), whilst the death rate in untreated animals was 36·2 per cent.—U. F. RICHARDSON.

STOTCHIK, J. (1935). **Report on Brine Treatment of Hypoderma Larvae in the Backs of Cattle.**—*J. Amer. vet. med. Ass.* **86.** 488-492. 2 tables. [2 refs.]

Salt sprinkled over the backs of cattle or applied as a wash has been used by stockmen, some of whom claim good results from its use. BISHOPP and co-workers found salt solution was lethal to three out of 21 *H. lineatum* and that dry salt killed 14 out of 91, whilst the action on 30 larvae was classed as doubtful.

Six long-haired Herefords were treated with brine warmed until hot to the

touch and then scrubbed over the backs with a stiff brush. Later 250 larvae were extracted, and were all found to be alive.

About 1 c.c. of brine was then injected directly into the cysts to a depth of ¼ to ⅜ inch by means of a can with a fine spout. Four animals were thus treated, the brine being injected at blood heat in three animals and at 70°F. in the other animal. Seven days later the larvae were extracted and found to be alive. The hair covering the larvae on one steer was kept short by frequent clipping, whilst brine at 70°F. was scrubbed over the back daily. A control animal was kept under observation. In the treated animal 11 larvae out of a total of 64 were found to be dead (17·2 per cent.) whilst in the control three out of 27 were dead (11·1 per cent.). It was concluded that the deaths of the larvae were due to handling and clipping and not to the action of the brine.—H. E. Bywater.

Metelkin, A. I. (1934). **Hyposulphite of Soda in the Treatment of Rabbit Mange.**—*Sovyet. Vet.* No. 11. pp. 80-82. [Abst. from French summary].

The author states that ear mange of rabbits is easily cured and recommends turpentine. Generalized mange of the face and body, caused by *Sarcoptes scabei*, var. *cuniculi*, is very difficult to cure. The author speaks of the method of Demianovitch ; two or three frictions with 60 per cent. hyposulphite solution, and a copious application of 10 per cent. hydrochloric acid solution 15 to 30 minutes later.—C. V. Watkins.

Bunyea, H., Couch, J. F., & Clawson, A. B. (1934). **The Nitrite-Thiosulphate Combination as a Remedy for Cyanide Poisoning in Sheep.**—*J. Wash. Acad. Sci.* **24.** 528-532. 4 tables. [2 refs.]

In these experiments the nitrite-thiosulphate treatment for cyanide poisoning was tried out on sheep. The cyanide was administered *per os* as KCN and treatment was carried out by intraperitoneal injection of 10 per cent. solutions of the smaller doses and 20 per cent. solutions of the larger doses.

From previous experiments the authors found that the M.L.D. of KCN for sheep was 2·315 mg. per kg. body weight. The doses administered to the experimental sheep varied from 2 to 3·5 M.L.D. Eighteen sheep were used and the tables show that the remedy is reasonably effective against 2·75 M.L.D. if given promptly.

Increase of the sodium nitrite to 2 to 3 g. did not increase the effectiveness of the remedy while it introduced the possibility of toxic effects due to the nitrite.

The most effective dose used was about 1 g. sodium nitrite and 2 g. sodium thiosulphate intraperitoneally for a 35 to 40 kg. sheep ; 2 g. sodium nitrite is the largest dose that should be given to such a sheep.—G. D. Shearer.

Bunyea, H. (1935). **Treatments for Cyanide Poisoning of Sheep and Cattle.**—*J. Amer. vet. med. Ass.* **86.** 656-661. [4 refs.]

This is a summary of the work which has been carried out by the United States Bureau of Animal Industry on the treatment of cyanide poisoning in farm animals.

In all experiments the cyanide was administered orally as a freshly prepared solution of KCN, and the remedies were given intraperitoneally or intravenously. The symptoms observed in fatal cases were increase in rapidity and depth of respiration, increase in pulse rate and hypersensitivity to stimuli and spasmodic muscular movements. No constant lesion was observed on *post-mortem* examination. The M.L.D., calculated as HCN, was found to be 2·042 mg. per kg. body weight for cattle, and 2·315 mg. per kg. body weight for sheep.

Methylene blue, sodium, tetrathionate, sodium thiosulphate and sodium nitrite were all tried as remedies, but the combination of sodium thiosulphate and sodium nitrite was found to be by far the most effective. Cattle, which had received two M.L.D. of KCN, recovered when given intravenously 10 c.c. of 20 per cent. $NaNO_2$ and then 30 c.c. of 20 per cent. sodium thiosulphate within four and a half minutes of receiving the poison. Sheep were protected against 2·75 M.L.D. when given 10 c.c. of 10 per cent. $NaNO_2$ and 20 c.c. of 10 per cent. sodium thiosulphate intraperitoneally. The remedy must be given within four minutes of administration of the cyanide.—G. D. Shearer.

Chen, K. K., Rose, C. L., & Clowes, G. H. A. (1934). **Comparative Values of Several Antidotes in Cyanid Poisoning.**—*Amer. J. med. Sci.* **188.** 767-781. 4 figs., 1 table. [68 refs.]

The authors have carried out experiments on a series of dogs to determine the antidotal value of a number of drugs used in cases of cyanide poisoning. It was found that amyl nitrite and sodium nitrite are twice as effective as methylene blue, and that sodium thiosulphate is also of great value. A rational treatment in cases of poisoning is suggested as follows :– the immediate inhalation of amyl nitrite for 15 to 30 seconds repeated every two or three minutes, combined with the intravenous injection of 4 per cent. sodium nitrite followed by 50 per cent. sodium thiosulphate ; this treatment should be repeated in one hour if the symptoms have not completely subsided and in two hours if there is no previous indication for repeating the antidotes. Using 22·5 mg. of sodium nitrite and 1·0 g. of sodium thiosulphate per kg. body weight as the first dose and 10 mg. and 0·5 g. per kg. respectively of these drugs as the second dose together with inhalations of amyl nitrite, it was possible to save dogs which had received up to 13 minimum lethal doses of sodium cyanide. Using suitable doses, such treatment should also be of value in the treatment of larger animals poisoned by plants containing prussic acid.—J. A. Nicholson.

Pataki, P. (1935). Organotherapie im Kampfe gegen die Sterilität. **[Hormonal Treatment of Sterility].**—*Münch. tierärztl. Wschr.* **86.** 1-5 and 15-17. [13 refs.]

A report on the use of " prolan " (Bayer) in temporary sterility in 16 cows, 3 mares, 4 sows and one bitch. In all cases, of course, the cause had been diagnosed as ovarian dysfunction and in all cases except in one mare oestrus followed as a result of one or two injections, in cows between the 6th and 19th days, in mares between the 9th and 15th days, in sows within 5 or 6 days, and in the bitch in 3 weeks.—J. E.

POISONS AND POISONING.

Quin, J. I., & Rimington, C. (1935). **Geeldikkop. A Critical Review of the Problem as it Affects Sheep Farming in the Karoo together with Recommendations in the Light of Newer Knowledge.**—*J. S. Afr. vet. med. Ass.* **6.** 16-24. 4 figs.

" Geeldikkop " is a disease of sheep occurring in the Karoo districts of South Africa and caused by the ingestion of wilted *Tribulus terrestris*. It is mainly a disease of lambs under 12 months old and occurs from December to March. One of the symptoms of the disease is a marked jaundice which may be noticed before the typical symptoms of photosensitization commence. The sensitivity to

sunlight, so characteristic of the disease, is due to the presence in the blood of phylloerythrin formed from chlorophyll. The prevention of the disease is largely one of supplementary feeding and is intimately associated with the drought problem. Attempts should be made to provide adequate shade for the sheep. Methods for the local treatment of the lesions in individual sheep are given.—E. M. Robinson.

Mettam, R. W. M. (1935). **Investigations into Poisonous Plants of Uganda. Part I.**—*Vet. J.* **91.** 153-161.

This is an account of feeding trials with various plants suspected of causing poisoning in stock in Uganda. Rabbits were used for the preliminary trials and if poisonous symptoms were observed further tests were conducted using sheep or cattle as experimental animals. The author realizes, however, the unsuitability of rabbits for experiments of this nature, as a plant which is poisonous to rabbits may be harmless to sheep or cattle and *vice versa*.

Feeding trials were conducted with 24 plants, the following of which were found to be toxic :– *Senecio abyssinicum*, *Hoslundia opposita* and *Oxalis corniculata* for sheep, and *Ageratum conyzoides*, *Erlangea tomentosa* and *Eriosema glomeratum* for rabbits.—G. D. Shearer.

Tocher, J. F. (1935). **The Proportions of Certain Poisonous Substances in Feeding Stuffs and their Effect on Livestock. [Salt, Linseed and Castor Seed Poisoning].**—*Vet. Rec.* **15.** 477-481. 2 tables.

It was found that pigs could tolerate large quantities (up to 3 oz. per day) of salt when added to their diet gradually, but that no beneficial effect was noticed from these large amounts. In the case of poultry, salt in the diet in a concentration greater than 3 per cent. proved deleterious and over 7 per cent. proved fatal.

Linseed contains a glucoside which in the presence of warmth and moisture is capable of producing hydrocyanic acid. Experiments were conducted on pigs and cattle in order to determine the toxic effects, if any, of the administration of large quantities of linseed. These experiments were supplemented by the administration of HCN and KCN in graded amounts. It is concluded that a pig may receive 2 lb. and half-grown cattle 4 lb. of linseed per day without danger of poisoning. The practice of mixing the linseed with water before administration has much to recommend it.

Pigs can tolerate the daily administration of 100 g. castor seed without bad results. Cattle can stand fully twice this amount. Evidence is produced to show that animals develop an immunity to castor seed poisoning. The medico-legal aspect of the contamination of foodstuffs with small amounts of castor seed is discussed.—Henry Dryerre.

Chorley, J. K., & McChlery, R. (1935). **Experiments on the Toxicity to Fowls of Arsenite of Soda and Poisoned Locusts.**—*Rhod. agric. J.* **32.** 322-326.

Since the introduction of sodium arsenite for the control of locusts, it has been alleged that many fowls have been poisoned by consuming the dead locusts after spraying.

Sodium arsenite (locust poison) was fed to birds in pills of pollards and the lethal dose, calculated as As_2O_3, was found to be between 0·5 and 0·75 grains for a bird weighing from 5 to 7 lb. Four birds were used, three of which died. The *post-mortem* findings were catarrh of the gizzard and intestines and slight enteritis.

Second stage locusts, which had been killed by spraying with locust poison, were dried, mixed with an equal part of pollards, and fed to a Rhode Island Red cock weighing 6 lb. It ate, during 18 days, 8·37 grains As_2O_3 or 0·465 grains

per day ; and for 12 ½ of these 18 days it was consuming 0·6 grains per day, which is a lethal dose. After being on experiment for ten days the bird improved markedly in appearance, its plumage became glossier and its comb more erect. It gained 4 oz. in weight and when turned out on the range again it gained 1 ½ lb. in less than two months.

The authors therefore conclude, as the result of the experiment on one fowl, that locusts, sprayed with a solution of locust poison of normal strength, can be fed to poultry without any danger.—G. D. Shearer.

Steyn, D. G. (1933). **The Toxicity of Sodium Chlorate.**—*Onderstepoort J. vet. Sci.* **1.** 157-162. 1 table. [8 refs.]

This is an account of experiments carried out to determine the toxicity of commercial sodium chlorate for rabbits, sheep and horses. The salt was administered by stomach tube as a 10 per cent. aqueous solution.

It was found that daily doses of 5 g. produced no symptoms in rabbits while a single dose of 10 g. was usually fatal. In sheep daily doses of 15 g. per day for three days produced death 20 hours after the last dose, but 20 daily doses of 7·5 g. only caused transient diarrhoea and inappetence. Severe symptoms were produced in a horse by 120 g. and 130 g. on successive days but 60 g. only produced slight methaemoglobinaemia. High temperatures were recorded in all cases of severe poisoning.

The author concludes, therefore, that on account of its comparatively low toxicity for stock sodium chlorate may be used as a weed killer with safety in South Africa.—G. D. Shearer.

PHYSIOLOGY.

Lamarre, L. (1933). Séméiologie du sang des bovidés. [**Semeiology of Bovine Blood**].—*Rec. Méd. vét.* **109.** 69-96. 23 tables, 2 charts. [Numerous refs.]

This is a good review : much knowledge on the subject has been gained during recent years. The author compares bovine with equine blood throughout the article. The proportion of blood to body weight is 1 : 12 or 13.

Red Blood Cells.—The proportion of erythrocytes to whole blood can be determined after natural sedimentation in horses, but centrifugation is necessary in cattle. Pathological variations in numbers, size, shape, colour and abnormalities are detailed. Each animal species possesses chemical characteristics in its haemoglobin. Tests to find minimum and maximum resistance of red blood cells to haemolysis, anaemia index (poverty of oxyhaemoglobin), etc., are explained.

Blood Platelets.—Number (also in relation to red blood cells) is higher in cattle than in the horse.

White Blood Cells.—The size, number of various kinds, and alteration of ratio of the different varieties according to age, nuclear structure of polymorphonuclear leucocytes, and pathological variations are detailed. Myelocytes and metamyelocytes are never found.

Physico-Chemical Properties.—Tests for density, viscosity and coagulability (variation according to temperature and thyroid activity) are given together with serum characteristics. The pH is regulated within narrow limits by a varying alkaline reserve. Details concerning the content of urea, glucose, calcium and magnesium are given. Experimental work has shown that cattle blood falls into three groups. The author explains why transfusion of whole blood from group I to a receptor in group II might lead to accident, although it is of little practical importance in transfusion work in general.—C. V. Watkins.

Pullinger, B. D., & Florey, H. W. (1935). **Some Observations on the Structure and Functions of Lymphatics: their Behaviour in Local Oedema.**—*Brit. J. exp. Path.* **16.** 49-61. 11 figs. [17 refs.]

A description of experiments carried out to show that lymphatic trunks passing from the testicle and in the thigh of the rat and guinea pig are rhythmically contractile. The lymphatics were filled artificially with " hydrokollag " suspension and observed by the binocular microscope. Similarly, the lymphatics contract vigorously when adrenalin and pituitrin are applied. It is suggested that muscle fibres are the causal factor.

Further experiments were also carried out to determine the behaviour of lymphatics in inflamed oedematous tissues. This has been a debated point for a number of years as it has been contended that, if tissue fluid pressure rises, lymphatics should be compressed. The authors produced local oedema of a mouse's ear by saline, histamine and calcium chloride injections with a micropipette, and also by heat. It was shown that under all these conditions the lymphatics remain dilated. Histological observations suggest that this is due to the intimate relation of the lymphatics to surrounding reticulum and collagen fibres. As the connective tissue fills with oedema fluid and swells, the tension on the fibres attached to the lymphatic capillaries causes their walls to be drawn apart, their dilation thus being passive.—J. R. M. Innes.

Trautmann, A., & Schmitt, I. (1935). Experimentelle Untersuchungen zur Frage der Psalterfunktion. [**Research on the Function of the Omasum**]. —*Dtsch. tierärztl. Wschr.* **43.** 177-179. 4 figs. [5 refs.]

By making observations on young goats submitted when a few months old to an operation producing both a reticulo-abomasal and a rumeno-abomasal fistula in order to provide a passage of food to the abomasum independently of the omasum, it was found that such animals grew at practically the normal rate and evidently enjoyed good health, as compared with normal control animals.

When killed at an age of 15 months, the omasum of the test animals was much smaller than that of the normal animals, and a comparison of them left no doubt that the function of the omasum is the mechanical one of reducing the size of food particles before entry into the digestive stomach.—J. E.

Clark, R. T. (1934). **Studies on the Physiology of Reproduction in the Sheep. I. The Ovulation Rate of the Ewe as affected by the Plane of Nutrition. II. The Cleavage Stages of the Ovum.**—*Anat. Rec.* **60.** 125-134 and 135-160. 1 text fig., 20 figs. on 4 plates, 5 tables, 1 chart. [40 refs.] [Copied *verbatim* from *Physiol. Abstr.* **20.** 243 and 244. Signed H. A. Harris].

I. The practice of " flushing " with increased quantity and variety of diet leads to a higher ovulation rate provided the ewes are not in high condition to start with. " Flushing " does not bring ewes into " heat " provided oestrous cycles have already been established. The ovulation rates are approximately the same as the lambing averages.

II. The initial cell division takes place between 38 and 39 hours post-coitum, to reach the 8-cell stage at 42 hours. The 16-cell stages were recovered from the Fallopian tube at 65 hours and the ova pass into the uterus between 77 and 96 hours. Differentiation of the trophoblast cells is observed in the 16-cell stage. Up to the close of the 6th day the ovum does not change in size; at the end of the 9th day the trophoblast has changed to a spherical vesicle distended with fluid, and implantation takes place between the 9th and the 11th days. No polar bodies were observed nor monozygotic twinning.

GREEN, W. W., & WINTERS, L. M. (1935). **Studies on the Physiology of Reproduction in the Sheep. III. The Time of Ovulation and Rate of Sperm Travel.**—*Anat. Rec.* **61.** 457-469. 3 figs. on 1 plate. [18 refs.] [Copied *verbatim* from *Anim. Breed. Abstr.* **3.** 148-149. Signed R. T. CLARK].

Twenty grade Shropshire ewes were tested by a teaser ram four times daily and bred as late in the heat as possible. To determine the rate of sperm travel, a saline wash of the infundibulum and oviduct is more convenient than smears. Ovulation appears to occur as the ewe is passing from heat. Ova were recovered from the uterus 9½ and 10½ days after ovulation but apparently lose the capacity to be fertilised in about 24 hours. The life of the sperm is also not more than 24 hours. Spermatozoa reach the infundibulum 5 hours after coitus, irrespective of whether or not the ewe is on heat; this suggests that the reproductive tract of an animal on heat does not give any special response. It is concluded that the best time for mating sheep is during the last 5-6 hours of heat.

MURR, E. (1933). Klima und Fortpflanzung bei den höheren Tieren. [**Effects of Climate on Reproduction in Animals**].—*Z. Zücht. B.* **28.** 469-475.

A review of the literature on the effect of heat and humidity, such as occurs in the tropics, on the sexual activity of animals (rats, mice, ferrets and birds) under experimental conditions. The common effect is a stimulating one affecting both sexes at all ages.—J. E.

BAXTER, J. S. (1934). **Some Observations on the Development of the Vagina in the Pig.**—*J. Anat.* **68.** 239-250. 5 text figs., 6 figs. on 1 plate. [13 refs.]

Evidence is now available that, developmentally, the vagina is a compound organ and that the mode of development differs in the various species and in members of the same order of mammalia. The vagina can be divided developmentally into upper, middle and lower segments. The upper is formed in common with the uterus by the fusion of the Mullerian ducts; the middle segment from the fused ends of the Mullerian ducts, and the lower segment essentially from a median Wolffian canal, interposed between the Mullerian ducts and urogenital sinus.—J. R. M. INNES.

STENERSEN, H. (1935). Den hormonale graviditetsdiagnostikk og dens muligheter innenfor husdyravlen. [**Hormonal Diagnosis of Pregnancy in Animals**].—*Norsk VetTidsskr.* **47.** 146-155 and 204-214. [4 refs.]

This article consists only of references and quotations from other original publications on the subject, and its claim is merely to give to readers a review of the present stage of research work on this subject.—GUSTAV NAERLAND (FARSUND).

STRUCK, M. (1935). Feststellungen und Betrachtungen über die Ausscheidung des Ovarialhormone bei Sauen während der Trächtigkeit. [**Excretion of Ovarian Hormone by Pregnant Sows**].—*Dtsch. tierärztl. Wschr.* **43.** 260-263.

The author attempts to explain the fluctuations which occur in the amounts of oestrin excreted in the urine of pregnant sows. It has been proved that oestrin is largely responsible for the growth of the uterine mucous membrane which is itself responsible for the nutrition of the fertilized ovum during the early stages of pregnancy. Thus, until the trophoblast has fully developed, oestrin is required to continue the stimulation of the uterine mucous membrane and little is excreted in the urine. In pigs, this stage is reached about the 15th day of pregnancy and corresponds to the first period when recognizable amounts of oestrin are found in

the urine. Oestrin also plays an important part in the development of the embryo during the later stages of pregnancy so that until the placenta has fully developed and can act as a storehouse for the required hormone, oestrin is not excreted in the urine. Pigs reach this stage after the 11th week of pregnancy and oestrin again appears in the urine. Oestrin disappears from the urine immediately after parturition as it is required by the body, probably to stimulate milk secretion.—J. A. N.

Steinmetzer, K., & Göldner, S. (1935). Die Nierenschwelle für Zucker beim Hund. [**The Renal Threshold for Sugar in the Dog**].—*Wien. tierärztl. Mschr.* **22.** 299-302. [9 refs.]

The method used was the usual one of giving glucose by the mouth and finding at what concentration of sugar in the blood a glycosuria first makes its appearance. Bladder fistulae were established in the dogs used and 40 to 50 g. glucose given *per os*; the urine was then tested every ten minutes by Fehling's qualitative method. As soon as a strong positive reaction for sugar was found in the urine the sugar was estimated in the blood by the method of Hagedorn and Jensen. The blood sugar was then estimated at intervals until it returned to a normal value.

From their experiments on eight dogs the authors conclude that the threshold value for sugar in the normal dog is approximately 0·18 per cent. of sugar in the blood. This is an average figure, but individuals did not fluctuate a great deal from this value. Once, however, glucose is present in the urine it does not disappear until the blood sugar falls below 0·13 per cent.

The threshold may be greatly disturbed in diseased conditions, e.g. diabetes mellitus in man, when the sugar in the blood may be greatly increased without an accompanying glycosuria, or a glycosuria may be present without any increase in the blood sugar.—G. D. Shearer.

Bertrand, G., & Nakamura, H. (1935). Recherches sur l'importance du manganèse pour les animaux. [**The Importance of Manganese to Animals**].—*Ann. Inst. Pasteur.* **54.** 421-427. 6 figs., 7 tables. [10 refs.]

This is a continuation of the work of the authors and their co-workers on the importance of metallic elements to the health of the animal. The specially prepared diets of Bertrand and Benzon, with and without the addition of manganese, were fed to mice. Of the 28 animals which survived the experiment, 15 had received manganese, the remainder received none. The former group had a mean survival of 27 days and the latter 24 days. It is concluded that manganese is necessary for the metabolic activity of animals.—Henry Dryerre.

von Oettingen, W. F. (1935). **Manganese: Its Distribution, Pharmacology and Health Hazards.**—*Physiol. Rev.* **15.** 175-201. 6 tables. [3½ pp. refs.]

Of late years much emphasis has been laid on the importance of the minute chemical constituents in plant physiology and agriculture generally, and amongst other constituents it has been shown that manganese has an important function in the metabolism of plants and animal tissues. Therefore, this timely review of our present knowledge of the physiological action of manganese in plants and animals is very welcome, especially as practically all the more important facets of the question are discussed. Manganese is found mainly in the liver and kidneys. It is very slowly absorbed from the intestinal tract and both the acidity of the gastric juice and solubility of the manganese compound affect the absorption. Excretion takes place in the colon but it may partly be excreted with bile and to a slight extent in the urine. In small doses manganese compounds produce little

toxic effect but oral administration of large doses leads to gastric disturbances. Central nervous symptoms have been reported after subcutaneous injection whilst on intravenous injection the most characteristic symptom has been circulatory disturbance. Animals treated with manganese compounds have shown degeneration of the liver and other organs and also degenerative changes in the central nervous system which vary in their extent and location with different species of animals. Several authors have reported that manganese stimulates growth and has a large effect on the generation of blood, but much of the evidence is weak and needs more corroborative results before it can be accepted. Therapeutically, manganese compounds have been advocated in a great variety of conditions but here again better controlled experiments and clinical observations of cases would appear to be necessary before the true value of manganese in the treatment of many of these conditions can be assessed.—James Stewart.

Greaves, J. E., Maynard, E. J., & Reeder, W. (1934). **Influence of Calcium Phosphorus Intake on Bovine Blood.**—*J. agric. Res.* **48.** 1033-1041. 4 tables. [27 refs.]

Forty grade heifers were sorted into five groups and fed for 150 days on a basal ration of beet pulp, molasses and alfalfa hay, supplemented in four groups with cotton cake, bran, barley and bone flour respectively. There was a close correlation between P in the ration and inorganic P found in the blood. A low negative correlation was observed between serum Ca and inorganic P.—H. H. G.

Bocker, R. B., Neal, W. M., & Shealy, A. L. (1934). **Effect of Calcium-Deficient Roughages upon Milk Yield and Bone Strength in Cattle.**—*J. Dairy Sci.* **17.** 1-10. 1 fig., 4 tables. [9 refs.]

Typical rations used in feeding Jersey cows at the Florida Agricultural Experiment Station supplied abundant protein, energy and phosphorus but were low in calcium. When supplemented with bone-meal (2 per cent. of the concentrates) the average milk yield increased by about 4 lb. per day and mineral storage in the skeleton was such as to confer a high breaking strength on the bones. Without the bone-meal supplement the milk yield was still good but the mineral reserves of the skeleton were depleted to such an extent that fractures occurred – the extreme case being a consistent milk producer over 11 lactations that broke her pelvis in three places after producing 8,152 lb. milk in the last period of 531 days. Autopsy of this animal gave femurs and humeri with a breaking strength of only 335 lb. as against 3,000 lb. for bone-fed controls. The use of corn silage grown on calcium low soils is discussed.

[Lesions are not discussed from the pathological point of view, but the indications are those of extreme osteoporosis, perhaps combined with osteomalacia or osteofibrosis. The rations were not only low in Ca but disproportionately high in P, the ratio being approximately 1 : 6 over ten years, 1908-1917. On such a ratio horses rapidly develop osteodystrophia fibrosa even on adequate calcium. Hence from a veterinary point of view the problem is not merely one of Ca low roughage but of response of the skeleton to mineral imbalance. Compare Theiler, this *Bull.* **5.** 583].—H. H. Green.

Ciurea, V. V. (1934). Cercetări asupra prezentei staniului in lapte. [**Research on the Presence of Tin in Milk**].—*Arhiva vet.* **26.** 117-118. 1 table. [2 refs.] [Abst. from French summary].

Tin is found in small amounts in the milk of all animals, proportions varying between 1·094 and 1·75 mg. per 1,000 c.c. milk. The tin content varies according

to the animal, the minimum amount of tin being found in ewe's milk and the maximum in that of mares.

Ciurea, V. V. (1934). Cercetări asupra prezentei staniului la câine. **[Research on the Presence of Tin in Dogs].**—*Arhiva vet.* **26.** 106-108. 1 table. [1 ref.] [Abst. from French summary].

Tin is found in all organs of the dog in proportions of 0·76 to 8·44 mg. per 1,000 g. fresh material and 4·41 to 27·42 mg. per 1,000 g. dry material. The highest tin content is found in the mucous membrane and muscle of the tongue, and in the hair, skin, liver and intestine.

Ciurea, V. V. (1934). Cercetări asupra repartitiei staniului in organismul câinelui in alimentatia căruia s'a introdus staniu. **[Research on the Distribution of Tin in the Body of a Dog fed on Food containing Tin].**—*Arhiva vet.* **26.** 126-127. 1 table. [2 refs.] [Abst. from French summary].

In dogs fed on food containing tin, the tin content of all organs was increased. The content was 1·12 to 22·90 mg. per 1,000 g. fresh material and 4·43 to 90·73 mg. per 1,000 g. dry material. The tin accumulated in the kidneys, skin and hair.

TECHNIQUE.

Sedlmeier, H. (1935). Thioninfärbung zur Darstellung von Bakterien und Parasiten im Schnitt. **[Thionin Staining for the Demonstration of Bacteria and Parasites in Sections].**—*Arch. wiss. prakt. Tierheilk.* **68.** 403-406. 4 figs. [17 refs.]

Bacteria, protozoa and gross parasites can be stained selectively in either paraffin, frozen or celloidin sections by the following method. Carbolthionin solution (1 c.c. saturated thionin in 50 per cent. alcohol, 100 c.c. of 1 per cent. carbol water), stain for five minutes at 50°C.; wash in water; differentiate in 1 per cent. carbol water, to which a few drops of acetic acid have been added, until no more colour comes away; wash in distilled water; wash in alkaline alcohol (2 drops potassium hydroxide to 100 c.c. of 96 per cent. alcohol) for a few seconds; dehydrate and mount. Counterstaining by an aqueous solution of eosin may be employed if desired.—J. R. M. Innes.

MISCELLANEOUS.

Mohler, J. R. (1934). **Participation of Bureau of Animal Industry in Live Stock Adjustment and Relief Measures.**—*J. Amer. vet. med. Ass.* **85.** 721-728.

An account of the Bureau's share in the measures [amazing in their magnitude to Europeans] for the relief of the economic situation in the United States of America in 1934.

In order to provide employment, and to keep up prices by removing surplus stock, the Civil Works Administration had 4,000 cattle dipping tanks built or repaired and supplied thousands of gallons of dip. Over 12 million dollars was provided, mostly for payment of compensation, to speed up tuberculosis eradication.

Similarly, the Agricultural Adjustment Administration provided 12 million dollars for a campaign against bovine contagious abortion and, finally, the Federal Government bought up for slaughter millions of cattle, sheep and goats in the drought-stricken states.

The Bureau's field staff have taken an important and essential part in these schemes in so far as they required skilled supervision.—J. E.

Junior, J. A. P. (1934). Escola de Medicina Veterinaria de São Paulo. Ligeiro historico. [**The Veterinary College at Sao Paulo**].—*Rev. Industr. anim.* **11.** 125-129.

A brief account is given of the organization of the college from 1917. At first it was under the administration of the Instituto Butantan and then under the Ministry of Agriculture, until its incorporation with the University of São Paulo in 1934. The number of pupils has now risen to 200.

Two appendixes give details of the syllabus for a four years' course and the numbers of students who have passed through the school each year.

OFFICIAL AND OTHER REPORTS.

Dominion of Canada. (1934). **Report of the Veterinary Director General for the Year ending March 31, 1934.** [Hilton, G.] pp. 59. 29 tables. Ottawa : J. O. Patenaude. [8vo].

The Veterinary Director General reviews the year's work of the branch as a whole and refers to the individual reports of the various divisions of the department which follow and are abstracted below.

Canada has now begun to allow the importation of livestock from Great Britain after prohibition for many years owing to the danger of the introduction of foot and mouth disease. The precautionary procedure in connection with the importations is described. The animals from England are passed through the London Quarantine Station and again quarantined on arrival in Canada. It was possible for ten consignments to be shipped direct from Scottish ports. Certain veterinary certifications are required.

All classes of cattle may now be exported from Canada to Great Britain, provided that they have been isolated for a 24-hour period, are tagged and accompanied by a certificate of health. All breeding cattle intended for export must be free from tuberculosis.

There were no bad outbreaks of contagious disease to report. Swine fever occurred in western Ontario, but was quickly suppressed. Glanders broke out in Quebec, as a result of which extensive mallein testing was undertaken, although the clinical outbreak was quickly suppressed. Mange in horses and cattle, and anthrax were observed in small areas only. Rabies was under control.

The campaign against bovine contagious abortion made good progress on a voluntary basis, 26 per cent. of accepted herds being found infected.

" Under the new agreement owners must forward blood samples after stated periods, which have been selected to meet the varying conditions in the herds. Those establishing double unit herds must strictly isolate infected animals and remove all calves from the infected herd as soon as possible after birth to neutral quarters, where they must be held until they pass a negative test after a ninety-day period.

" All additions, unless coming from a herd of equal health status, must have passed a negative test before arriving on the premises and must be isolated upon arrival until they pass another negative test after a sixty day period.

" The dairy products fed to calves must be obtained from negative herds, or must be pasteurized by heating to not less than 150 degrees F. for twenty minutes."

The control of bovine tuberculosis also made good progress by means of the " accredited area " plan and, at present, one quarter of all cattle of the Dominion are included in it. Meat inspection returns for 1932 to 1933 showed an incidence

of tuberculosis in cattle of only 1·81 per cent. of over half a million cattle ; this constitutes a drop of 2·9 per cent. since 1924 to 1925.

" Comparing the fiscal years 1924-25 and 1932-33 with branch appropriations of $2,000,000 and $2,073,778 respectively, the total number of tuberculin tests conducted under compensation policies was 348,247 and 1,063,071. The total number of reactors was 16,540 and 21,893, and the compensation amounted to $774,689 and $603,855 respectively. The average compensation cost per animal has consequently been reduced by approximately $47 to approximately $27 per head, and the compensation cost of this work is now approximately 57 per cent of what it was during the period 1924-25.

" Testing under the supervised herd plan has increased from 1,753 tests in 1924-25 to 184,091 for the fiscal period ending March 31, 1933, and to 327,625 during the year under review, although reactors are slaughtered and no compensation is paid."

" While Johne's disease has been recognized in this Dominion, it is believed to be of rare occurrence, but, with improved and greater facilities for the transportation of cattle, it will undoubtedly spread unless it is promptly detected and suitable measures taken to protect healthy cattle."

" In compliance with a request from the Department of Pensions and National Health an order was passed on March 1, restricting the importation of birds of the parrot family. It was considered necessary to take this action to prevent the introduction of a serious disease of parrots known as psittacosis, which is transmissible to man and produces a serious and often fatal disease in the human being."

Certain changes in the veterinary staff of the department are described, and reference is made to the need for controlling biological products.—J. E.

Dominion of Canada. (1934). **Contagious Diseases Division [Report].** [Cameron, A. E.]—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 11-17.

The position remained favourable.

Dourine has not been observed for 14 years.

" Two outbreaks of anthrax occurred in Ontario in the Muskoka and Oshawa districts.

" This disease is not prevalent in Canada. A chart appended shows the outbreaks of anthrax since 1903."

" Glanders was discovered in a stable at Coaticook, P.Q., and in testing contacts it was soon discovered that a considerable amount of infection existed. It was found that the infection was probably a carry-over from an outbreak in the Knowlton district in 1931. The disease has not yet been eradicated and to March 31, 1934, a total of 1,167 horses have been tested and 233 were destroyed at a compensation cost of $18,305·33. The outbreak appears to be restricted to the Eastern Townships in Southern Quebec.

" Glanders is controlled by a policy of slaughtering all equine animals which react to the mallein test. All contact equines are traced and tested with mallein. This policy has been effective in controlling the disease.

" One outbreak of hog cholera occurred in Essex county, Ontario. Altogether 1,321 hogs were destroyed at a compensation cost of $5,620. No less than 11,300 hogs were quarantined on 850 premises. Hog cholera is controlled by a policy of destroying infected hogs and payment of compensation. Hogs on adjacent premises or in close proximity to infected hogs are treated with anti-hog cholera serum as this has been found effective in producing temporary immunity and preventing the spread of infection.

" The importation, manufacture, sale or use of hog cholera serum or virus is prohibited except by an inspector acting under special authority and this authority is only given for the use of serum by veterinary inspectors of this branch.

" The feeding of collected garbage to swine is prohibited except under licence and this is believed to assist greatly the prevention of hog cholera."

Sarcoptic, psoroptic and chorioptic mange were found in cattle in New Brunswick, Ontario, and in Manitoba ; equine mange, persisting from the previous year, was stamped out in New Brunswick.

Sheep scab has not been seen in Canada since 1928. Rabies occurred only in Ontario, and was diagnosed in two dogs, one horse, one cow and one pig : it is now under control.

Bovine Tuberculosis.

" *Accredited Herd Plan.* Herds are accepted under this plan if they include at least five pure-bred cattle of one breed, registered in the name of the owner, and this number

constitutes at least one-third of the entire herd. Before an accredited herd certificate is issued, however, the herd must include ten pure-bred registered cattle.

" An accredited herd is one which has passed two clean tests with an interval of one year, or in case reactors were found in the herd, three clean tests with intervals of six months.

" On March 31, 1933, fully accredited herds numbered six thousand three hundred and ninety-seven (6,397). The number undergoing accreditation was one thousand and twenty-two (1,022) and two hundred and eleven were awaiting test.

" The number of tuberculin tests under this plan was 249,911 and 1,663 reactors were slaughtered. The compensation awarded was $65,034·33.

" *Supervised Herd Plan.* Owners of herds of grade cattle who cannot qualify for the accredited herd plan may take advantage of this plan to establish herds free from tuberculosis. All care is taken to eliminate infection and the same methods are followed as in the accredited herd plan but no compensation is paid for reactors, although they must be slaughtered under supervision."

" Municipal Tuberculosis Order." The method of control provided for under this order has now become obsolete. Over 401,000 cattle were tuberculin tested and 6,615 reactors were slaughtered.

Restricted Areas Plan.

" In restricted areas all cattle were tested with tuberculin, the reactors slaughtered under supervision and compensation paid. With the exception of cattle for immediate slaughter on approved premises and feeder cattle which are tested on arrival at destination all cattle entering an area for permanent stay must be accompanied by an official certificate of tuberculin test.

" The cattle tested in new areas during the past year and those retested in areas previously established numbered 401,141 ; altogether 6,615 reactors were slaughtered at a compensation cost of $140,000."

Bovine Contagious Abortion.

" Assistance is offered to stock owners in controlling this disease by conducting blood tests of their cattle in order that the infected animals may be segregated or slaughtered as the circumstances warrant.

" An increasing number of owners are taking advantage of this assistance and there are now 516 herds under supervision."

The text of the agreement form between the department and farmers is given in full : it has been amended to guard against backsliding by herd owners.

—J. E.

Dominion of Canada. (1934). **Pathological Division [Report].** [Watson, E. A.]—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 40-56. 2 tables.

" Progress has been made in scientific research in animal diseases, especially those of major economic importance in the raising of domesticated and fur-bearing animals, conducted at the Animal Diseases Research Institute, Hull, P.Q., the Veterinary Research Station, Lethbridge, Alta., and the Pathological Laboratory, Saanichton, B.C.

" Diagnostic and routine laboratory services, although greatly increased in scope and volume, have been well maintained, and the manufacture and issue of tuberculin and mallein and other biological products has met all requirements."

Biological Products.

Tuberculin.—Since 1924, research on tuberculin prepared on non-protein media – those of Sauton, Dorset and Long – has been pursued.

" The tuberculins produced in the pure synthetic culture media, free from the complex proteins present in meat broth media, have proved superior in several ways both as regards potency and uniformity and lend themselves to more accurate and precise methods of standardization. Tests made with this special tuberculin upon experimental cattle known to be tuberculous and on healthy cattle known to be free from tuberculosis were commenced early in the year 1932 and proved very satisfactory, and its further use in the field during this same year has been reported upon very favourably. A method for a large scale production of this tuberculin has been devised and large quantities have been prepared and issued during the past year. It is very probable that in the future tuberculin will be made from a culture media prepared entirely according to a standard chemical formula."

Miscellaneous Biological Products.—Similarly, an attempt is being made

to prepare a purer mallein from cultures grown on special media. Anti-distemper serum, vaccine and virus are prepared, the former for wide use and the others at present only for research purposes. *Brucella abortus* antiserum was also made and used with success on human cases of undulant fever.

Laboratory Services.

A short account of the diagnostic work is given. Bovine contagious abortion and *Salmonella* (formerly *Bact.*) *pullorum* infection were responsible for much of the work under this head, but a wide variety of subjects was covered.

Research.

Reports as shown below have been dealt with individually, and are abstracted elsewhere in this issue. They are concerned with tuberculosis research [p. 680.], Johne's disease [p. 689.], swine erysipelas [p. 691.], haemorrhagic septicaemia [p. 732.], *Br. abortus* infection [p. 697.], distemper in carnivora [p. 718.], cattle warbles [p. 726.], and genital diseases of cattle [p. 745 and 746].

Veterinary Research Station, Lethbridge, Alberta. [Heath, L. M.]

Diagnostic work was mainly concerned with *S. pullorum* infection, 20,000 specimens being examined. Goose septicaemia was found to be transmissible by carriers, 22 per cent. of a flock of 63 geese reacting to an agglutination test.

Agglutination test work on equine infectious abortion showed that reactions at a titre of up to 1 : 200 are non-specific.

Pathological Laboratory, Saanichton, B.C. [Bruce, E. A.]

Over 20 cattle on a redwater farm were kept under close observation, but only one mild case developed. Investigations are in progress. An investigation into "lunger" disease of range sheep showed that it was a secondary pneumonia following poisoning by *Astralagus campestris*.

Other work was done in connection with bacillary white diarrhoea in chickens, coccidiosis, swine erysipelas and bovine contagious abortion, and much routine diagnosis was dealt with.—J. E.

Dominion of Canada. (1934). **Meat and Canned Foods Division [Report].** [Barnes, R.]—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 33-39. 4 tables.

The work of the division increased during the year owing to an addition to the number of plants brought under supervision. Many plants still remain free from government control and it is stated that the public are not yet sufficiently alive to the advantages of buying only meat products bearing the government mark, which indicates complete freedom from disease of the foodstuffs inspected and passed.

The export trade in pork products showed an increase. A list of the 73 meat packing plants operating under the Meat and Canned Foods Act is given, and the numbers of slaughter animals dealt with in each province, together with information on the material condemned, are given in tables.

133,500,000 lb. of meat and meat products were exported.

Finally, statistical information relating to diseases causing condemnation of carcasses or parts thereof are given.—J. E.

Dominion of Canada. (1934). **Poultry Pathology Laboratory (Ottawa) [Report].** [Weaver, C. H.]—*Rep. vet. Direct. gen. Dep. Agric. Can. 1934.* pp. 57-59. 8 tables.

This is the only laboratory in Canada specializing in and dealing only with the diseases of domestic fowls.

During the year, 1,960 fowl specimens were examined ; the results are given in a table. The chief causes of loss were intestinal parasitism, infectious laryngotracheitis and *Salmonella pullorum* infection. 14,800 blood samples were examined by the tube method for the latter ; 48 of 370 pens of hens at an egg-laying trial contained reactors.

" Sporadic diseases here occupy a position exceeding the specific disease losses. Two conditions of the former group have been chiefly considered. These are Cannibalism and Avian Dermatitis. A paper on Cannibalism is in the scientific press at the time of writing. The Dermatitis, evidently an unreported abnormality, is characterized by an intense inflammation of the corium. This destroys the life of the feather with a subsequent breaking of the shaft near the surface of the epidermis. Thus bald patches appear on the body with a vivid reddening of the skin."

—J. E.

DOMINION OF CANADA. (1934). **Report of the Ontario Veterinary College 1933.** [MCGILVRAY, C. D.]. pp. 67. 11 figs., 13 tables. [Numerous refs.] Toronto: H. H. Ball. [8vo].

A total of 160 students were enrolled for the year : this number was considered quite sufficient to keep up the strength of the profession. There is great competition for veterinary inspectorate posts in the Health of Animals branch of the Ministry of Agriculture, and the college runs a short course of post-graduate instruction for candidates, the syllabus of which is given.

There are clinics for all classes of animals, and laboratories for diagnostic services and the preparation of vaccines.

A list of the teaching and research staff is given. Research work conducted by the college staff is described and the bulk of the report is devoted to accounts of this work.

[Reports on bovine haemoglobinuria, infectious diarrhoea and mineral deficiency diseases in cattle have been abstracted in this *Bull.* **4.** 651 and 667, and **5.** 92].—J. E.

DOMINION OF CANADA. (1935). **Report of the Division of Pathology and Bacteriology, Ontario Research Foundation.** [HADWEN].—*Ont. Res. Found. Rep. 1934.* pp. 15-19.

A staff list and a long list of publications is given in the appendixes. For four years a systematic investigation on bovine contagious abortion was carried out which is summarized as follows :– (a) the loss due to abortion in Ontario Province is estimated at four million dollars annually ; (b) chemical remedies were found of no curative value. No evidence was obtained that killed cultures had any curative or prophylactic value : live cultures are considered dangerous, but a trial of live cultures of low virulence is recommended ; (c) the agglutination test, when carried out by competent men, is considered to be consistent and reliable ; (d) a rigid policy of testing and segregation will gradually eliminate reactors from herds ; (e) by testing and elimination the disease was eradicated from several hospital herds, and a definite increase in milk production was noted, and (f) at present the clean area plan is considered to be the most practical method of dealing with the disease.—F. H. MANLEY.

JAMAICA. (1935). **Report of Government Veterinary Surgeon.** [LOCKETT, S.] —*Rep. Dep. Agric. Jamaica, 1933.* pp. 11-18.

Bovine tuberculosis was absent from both the government stock farms at Hope and Grove Place, but was occasionally observed at abattoirs and on private farms. The incidence, however, is thought not to exceed 3 per cent.

Anthrax and blackleg were observed, but caused little loss. Only two small outbreaks of bovine piroplasmosis occurred. Bovine contagious abortion was present at the Hope farm.—J. E.

India, Mysore. (1935). **Administration Report of the Mysore Serum Institute for the Year 1933-34, with the Government Review thereon.** [Achar, S. D.] pp. 27. 24 tables. [fcp].

The work of this institute comprises the preparation of vaccines and sera for the Mysore Civil Veterinary Department, while at the same time supplying the demands of several other Indian States. The value of the products was considerably more than the amount of the expenditure.

Sera were issued for use against rinderpest, blackleg, haemorrhagic septicaemia and anthrax. A haemorrhagic septicaemia vaccine, sheep pox vaccine, a blackleg formolized culture, and a blackleg filtrate were also prepared.

Goat-adapted rinderpest virus was maintained and successfully used in the field. Experiments are proceeding on the practical application of this virus as a single inoculation against rinderpest in cattle. The immunity produced has been shown to last at least eight months.

It was demonstrated that the virus kept in cold storage maintained marked potency up to ten days. After storage for 19 days no reactions were produced. A definite conclusion has not yet been obtained on storage at room temperature.

Owing to the severity of the reaction produced this goat virus is unsuitable for use in buffaloes. Phenolized goat spleen vaccine conferred immunity against artificial infection.

The sheep pox vaccine is apparently a glycerinized lymph. Details of testing and dilution are not given.

Results of over 3,000 smear examinations are included in the tables, and a list is given of parasites which have been classified.—F. H. Manley.

Sweden. (1934). Det civila veterinärväsendet år 1933. [**Report of the Civil Veterinary Department for 1933**]. [Hellström, N.] pp. v + 45. 30 tables. Stockholm : Kungl. Boktryckeriet. P. A. Norstedt & Söner. [8vo] [French summary : abst. from orig.]

The number of veterinarians in Sweden was 594 in 1933 : 238 were district veterinary surgeons, 130 were in charge of abattoirs, 26 were provincial veterinary officials, 17 were teachers, 33 held army commissions, 31 were meat inspectors of material intended for export and the remainder were variously employed. Exclusive private practice is practically unknown in Sweden. The geographical distribution of veterinarians is shown in a table.

Animal Diseases.

Anthrax showed a decrease in incidence, only 97 deaths being reported.

Bovine Tuberculosis.—Of 31,250 cattle over two years old, 4,980 between one and two years old and 6,000 calves dealt with, 14·4, 11·8 and 6·9 per cent. respectively reacted to the tuberculin test. Parallel tests on 89,300, 19,400 and 20,000 head of cattle in similar age groups, but in herds " protected against tuberculosis " [hygienic measures alone ?], revealed an infection incidence of 2·8, 2·2 and 1·5 per cent. respectively. 3,325 herds with 74,940 animals were tuberculosis-free. 162 cows were slaughtered on account of udder infection.

Bovine Contagious Abortion.—About 1,460 herds were infected.

Blackleg and Swine Erysipelas caused 25 and 96 deaths respectively.

Foot and Mouth Disease.—The outbreak which started in 1929 was finally eradicated during 1933, when only two cases were diagnosed. The policy of

slaughter and compensatory payment has cost over one and a half million kronor, 4,800 cattle, 7,300 pigs, 190 sheep and 4,400 head of poultry having been slaughtered.

EQUINE INFECTIOUS ANAEMIA was diagnosed by blood examination in 282 horses.

SWINE FEVER.—No cases were reported.

FOOD CONTROL.

There are eight public abattoirs in Sweden in the largest towns. There are in addition 113 communal meat inspection centres throughout the country. Statistics on the animals dealt with are given.

Figures showing the results of milk inspection include only 36 cases of tuberculosis infections.—J. E.

FRANCE. (1935). Rapport sur les travaux du laboratoire militaire de recherches vétérinaires pendant l'année 1934. **[Report of the Army Veterinary Research Laboratory (Alfort) for 1934].** [CARPENTIER, G.]—*Rev. vét. milit.* **19.** 89-101. [6 refs.]

This report is in five sections. The first, which is the longest, records laboratory work carried out during the year in connection with certain special conditions, viz. equine infectious anaemia, strangles and typhoid affections generally, certain suppurative conditions, anthrax, glanders and tetanus. Infectious anaemia is dealt with at some length, and nearly half the samples of material received by the laboratory during the year were from cases of this condition. Fulton's test as a means of diagnosis was found to give a high measure of success. There is a note on work carried out in connection with the presence of iron in the liver of affected animals and on the reaction of cases to tuberculin injections.

The second section records very briefly laboratory work connected with helminthiasis, ringworm and mange. Section three gives a list of 13 neoplasms submitted for examination ; section four, a note on museum specimens. The final section refers to the relationship between the laboratory and workers in the field.—C. DAVENPORT.

LEVANT. (1935). Rapport sur le fonctionnement du laboratoire de recherches du service vétérinaire des troupes du Levant pendant l'année 1934. **[Report of the Military Veterinary Laboratory of the Army of the Levant (Beyrout) for 1934].** [SOULIE].—*Rev. vét. milit.* **19.** 113-124. 2 tables.

Though primarily a military establishment, this laboratory undertakes work on behalf of both civil and military departments. The report covers its activities in both fields. It opens with a note on personnel and a list of the samples of material received for investigation during the year, and then proceeds to record work carried out under the headings of glanders, anthrax, blackleg, and rabies. There is a note on mammitis of the cow and on cutaneous abscesses in the camel. A table showing the results obtained with Fulton's test and the formol-gel test in dourine is included. Another table shows the various piroplasms met with in the course of routine blood-smear examinations. *Cryptococcus farciminosus* was detected in nine cases of epizootic lymphangitis, one case of which responded well to treatment with a chaulmoogra oil-copper preparation.

There are five short appendixes, viz. the application of Vernes' resorcin reaction to the horse and mule ; vaccination against anthrax ; antirabic vaccination ; the diagnosis of avian spirochaetosis and the treatment of equine piroplasmosis with piro blue.—C. DAVENPORT.

—. (1934). **Report of Work in New Hampshire in Avian Pathology and Infectious Abortion.**—*Bull. N. H. agric. Exp. Sta.* No. 288. pp. 22-24 and 25-27.

The greater part of the report is given over to a discussion of epidemic tremor or " trembling chick disease " believed to be due to a virus which is transmissible experimentally by intracerebral inoculation but not by contact. The results of a large number of autopsies on adult fowls are given, a high percentage of deaths being attributed to " ruptured egg yolk ".

There are short notes on *Salmonella* (formerly *Bact.*) *pullorum* infection, coccidiosis and fowl pox. The latter disease is said to be spreading, but vaccination is not recommended except in special circumstances.

A short account is given of testing six herds for contagious abortion and the isolation and elimination of reactors, good results being obtained in five of the herds.—J. E. Wilson.

BOOK REVIEWS.

Smith, Theobald. [late Director Emeritus of the Department of Animal Pathology, Rockefeller Institute for Medical Research]. (1934). **Parasitism and Disease.** pp. xiii+196. 3 tables. Princeton : Princeton University Press, and London : Humphrey Milford, Oxford University Press. [8vo] [9s.]

This book is based on the author's Vanuxen lectures, which have been amplified in their treatment of various aspects of the subject and extended by the addition of new chapters which widen the scope of the original matter. It is a broad survey of an important branch of medicine and represents what might be termed the " summary and conclusions " of a life of ceaseless observation, experimentation and thought on the association between parasites and disease in man and in animals.

The writer's wide interests are much in evidence, as also is his clear outlook and ingenious approach to the study of disease problems. The purely scientific interest, striving after the more fundamental knowledge embodied in physics and chemistry, and the practical medical interest, trying to apply this knowledge to problems of disease control, are recognized as two separate tendencies in this field of research. Smith's interests were concerned principally in the last mentioned field, but, as is pointed out, the medical investigator has often dug deep, and as a result has greatly enriched biology without specially setting out to do so.

Probably there is no one more qualified than Theobald Smith to write on parasitism – which as he sees it is a complex of give and take having its roots in the interdependence of all living things, and the account of the present position of our knowledge on the subject, as it appears in this book, will stand for the future as one of the periodic statements by which to trace the progress of the science of parasitology.—E. L. Taylor.

Runnells, R. A. [D.V.M., M.S., Associate Professor of Veterinary Pathology, Iowa State College]. (1935). **A Guide to the Study of Special Veterinary Pathology.** pp. xiii+218. 1 table. [672 refs.] Ames, Iowa : Collegiate Press, Inc. [8vo] [$3].

Within a compass of 206 text pages – of which approximately 37 are devoted to references, mainly American – it is attempted to furnish " the essential facts concerning the occurrence, etiology, pathogenesis, microscopic and macroscopic appearances and the results or termination of disease processes as they are related to the various systems of the body and to the specific infectious diseases ". Towards this end, the first 119 pages are devoted to the cardiovascular, haemopoietic,

respiratory, alimentary, genito-urinary and nervous systems, whilst 79 pages are given to the pathology of the specific infectious diseases, which have been arranged on an aetiological basis.

As can be readily imagined, the book suffers from over-condensation. It is in no sense introductory, neither is it a complete text-book [a fact which is admitted by the author]. Students will find that the data are of the scantiest, that some of the statements are at variance with modern accepted views and that there will be demanded of them much supplementary reading of original papers and reports of research, which undergraduates are ill-fitted to understand or to appreciate. They will seek in vain, too, for the disorders of the osseous and the locomotor systems.

Even at its best the book seems of use only for a final cramming prior to examination.—J. W. EMSLIE.

LAPORTE, O. (1934). Les maladies de la peau du chien. **[Skin Diseases of the Dog]**. pp. 164. 15 figs. Paris : L'Eleveur. [8vo] [Fr.25].

It is disappointing that this publication on an important specialized branch of clinical medicine cannot be recommended. The plan of the book is orthodox, introductory chapters dealing with the care and management of dogs being succeeded systematically by accounts of the various parasitic and non-parasitic skin diseases, and finally by a brief chapter on cutaneous tumours. The work is marred by a lack of detail evident throughout. For example, the description of the technique for the demonstration of the canine sarcopt is extremely poor while microscopic confirmation of the diagnosis of ringworm is entirely omitted.

Contemporary literature has apparently been overlooked. Amongst other instances, it may be stated that derris is not mentioned in the treatment of fleas and lice, and no reference is made to Wood's glass as an aid to the diagnosis of ringworm. The author attempts the impossible in endeavouring to illustrate skin diseases by line drawings ; the few that are given are of poor quality. No scale accompanies the diagrams of parasites, which are consequently of less value than they should be.—J. W. H. HOLMES.

RAPPAPORT, F. (1935). Mikrochemie des Blutes. **[Biochemistry of Blood]**.—*Monogr. Gesamtgeb. Mikrochem.* pp. xi + 206. 51 figs., 24 tables. [96 refs.] Vienna & Leipzig : Emil Haim & Co. [8vo] [RM.16.80].

This is an extremely useful and clearly written account of the methods in general use for the estimation of the more common chemical constituents of the blood. The book is divided up into 11 chapters and an appendix as follows :–

Chapter I – Determination of specific gravity, moisture content and refractive index of blood and serum ; chapter II – Blood gas analysis ; chapter III – The anions Cl_2 and I_2 and P in its various organic and inorganic forms ; chapter IV – The metals ; chapter V – N_2 of non-protein origin and the compounds in which it is contained ; chapter VI – The various plasma and serum protein fractions ; chapter VII – The sugars ; chapter VIII – The ketone bodies ; chapter IX – The fats and lipoids ; chapter X – The bile pigments, and chapter XI – The enzymes. The appendix describes numerous pieces of useful apparatus and the preparation of various standard solutions used in the determinations.

A few lines are added at the end of the description of the methods of estimation of each component, giving the normal range in the human subject and a short account of its fluctuations in various pathological conditions.

In most cases alternative methods are given for each constituent with a micro-method using about 0·2 c.c. of blood.—G. D. SHEARER.